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ABSTRACT

This report provides the results of a task force examination of the status of high technology programs on the nine campuses of the Los Angeles Community College District (LACCD) and exploration of alternative funding possibilities. After an introductory section, placing the report in the context of a larger study of options for strengthening occupational/technical education in the LACCD, Part II provides the results of faculty and student surveys concerning existing LACCD programs in computer science, electronics, and avionics. Part III examines similar programs at other postsecondary institutions in the LACCD area with respect to needs, instructional techniques, curricula, and program success. Part IV considers federal, state, district, and private funding sources for technical education programs. Part V considers the advantages and disadvantages of five options for expanding technical education in the District: expanding programs at each college in the District; expanding selected programs at specific colleges based on need, industry demand, or job opportunities; creating a master plan that designates specialization in various technical areas at specific colleges; establishing a technical institute as an off-campus educational center under the auspices of one or more colleges; and establishing an autonomous technical institute. Recommendations for strengthening existing programs are offered in Part VI, while appendices profile existing programs and offer survey results and instruments. (KL)

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Meeting Technical Education Needs: An Industry-Responsive Model

Los Angeles Community College District

April 28, 1982

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A Supplement

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INTRODUCTION

On September 23, 1981, the Los Angeles Community College District Board of Trustees received the report Meeting Technical Education Needs: An Industry Responsive Model. The report presented the results of a feasibility study of options for strengthening occupational/technical education in the Los Angeles Community College District. The study had been recommended by Chancellor Leslie Koltai in his State-Of-The-District Address on October 15, 1980, in which he spoke of the need to enhance technical education programs, and had been authorized by the Board of Trustees in March 1981. As directed, the study examined three alternatives: establishment of a separate technical institute; establishment of a technical institute as an off-campus educational center under the auspices of an existing college; and strengthening specific vocational programs at all colleges.

The study drew on the expertise of six advisory committees, with representatives of business, industry, labor, education, and government; and included surveys of faculty, students, alumni, department heads, business and industry, and studies of labor force needs and population trends. While the faculty, student, and alumni surveys focused on the San Fernando Valley, the business and industry survey, and the labor force studies were districtwide.

In the September 23rd report the study task force presented its findings and recommended the phasing-in of a technical institute incorporating the following concepts:

1. State-of-the-art curriculum which is competency-based
2. Innovative delivery systems and scheduling
3. Diagnostic testing and pre-technical curriculum
4. Faculty development
5. Industry liaison
6. Alternate sources of funding including contract education and worksite training

Since the results of the first study made evident the need for a districtwide solution, the Chancellor then directed the study task force to examine the status of high technology programs on the nine campuses of the Los Angeles Community College District and to explore alternative funding possibilities.

The Supplementary Study

The findings of the expanded study are presented in this supplementary report. As part of the data gathering for the report, surveys of

faculty at all nine campuses who were teaching in technical programs (e.g. computer science, business data processing, electronics) and of students enrolled in courses in these programs were conducted. Heads of departments which had technical programs (or senior instructors) were interviewed during site visits to the nine campuses. A comprehensive review of alternative funding sources was made by the study task force.

Funding

Funding sources including those from state, federal, private foundations, and business and industry sources were identified. Through one of these sources, the California Worksite-Education and Training Act, the District is being awarded a grant of $3,000,000.00 to provide worksite training for more than 850 people over the next 30 months. This is the largest grant ever awarded by CWETA. (Discussion of further funding sources is contained in this report.)

The extended study re-examines the three alternatives outlined by the Board of Trustees to the original study in the light of findings from the expanded surveys and the review of alternative sources of fundings.

Results of the Supplementary Study

This districtwide study of existing programs found basically the same circumstances that faced Valley colleges in the first study: That programs, however good, have the following limitations:

1. Obsolete and inadequate equipment, with a few exceptions
2. Overenrolled classes
3. Limited facilities
4. No time for new course development or curriculum updating
5. Students lacking math and English skills
6. Little assessment prior to entering programs
7. No pre-technical programs except at Trade-Technical College
8. Little or no pursuit of contract education
9. Few grants or specially funded projects
10. Limited innovation such as modular classes, open-entry/open-exit, computer interactive or competency-based
11. Formal industry liaison largely limited to once a year advisory committee meetings
12. Little coordination and master planning among colleges

The findings of the study indicated: (1) the need to strengthen existing programs and (2) the need for a multi-faceted approach to address the demand for technical education in the Los Angeles Community College District. The task force determined that a flexible delivery system in addition to the existing programs would be the most appropriate response, and that such a system would be most accurately described as a series of high technology centers - multiple instructional sites located throughout the Los Angeles Community College District and offering a variety of services, curricula, and delivery methods tailored to specific local needs.

Recommendations

The study task force recommends: 1. the strengthening of existing programs, and 2. the establishment of a unit in the Educational Services Division to develop and administer high technology centers and contract education programs. (See detailed recommendations in Section VI.) This unit will coordinate and cooperate with all colleges to provide:

1. CWETA/worksite training
2. Extension-style workshops and seminars (e.g. computer literacy)
3. Master planning of high technology programs
4. Technical and pre-technical curriculum development
5. Resource development
6. Districtwide industry/labor liaison
7. Innovative delivery systems and schedules
8. Opportunities for faculty re-training or updating
9. Identification or development of assessment programs

Coordination with the colleges will be provided through a committee of all college presidents, chaired by the President of Los Angeles Trade-Technical College. Decisions regarding program development, grant proposals, locations, and offerings will be under the jurisdiction of this committee. The primary identification for resource development and credit granting purposes will be to Trade-Technical College.

Because high technology industry within the District is largely concentrated in the West San Fernando Valley and in the international airport area, it is recommended that the first technical

education center, funded through the CWETA grant, be located in a leased facility in the San Fernando Valley. Industry in the airport area will be served through programs in cooperation with the Airport College Center and/or mobile classroom/ laboratories.

II REPORT ON THE STATUS OF EXISTING PROGRAMS

A. FACULTY SURVEY

1. Purpose

The questionnaire sought to assess faculty opinions in eight areas:

a. The state of existing Los Angeles Community College District programs in computer science, electronics, and related technical programs (e.g. business data processing, aviation maintenance)

b. The need to expand computer science, electronics, and related programs in the District

c. The preferred method of expanding these programs, if expansion is required:

(1) supplement existing programs

(2) establish an off-campus center

(3) establish an autonomous institute

d. The perceived impact of an off-campus center or an autonomous institute on existing programs

e. New courses, equipment, facilities and personnel needed to improve existing programs

f. Existing equipment needing to be updated

g. Preference for particular options to supplement existing programs

h. Preference for particular professional development activities

2. Target Population

All full and part-time faculty teaching in Computer Science, Business Data Processing, Aviation Maintenance,and Electronics at the nine Los Angeles Community College District Colleges received a questionnaire. A total of 248 questionnaires were distributed to 89 full-time faculty and 159 part-time faculty.

3. Procedures

Faculty at the three Valley Colleges were resurveyed because the instrument was changed to reflect additional information learned after the initial faculty survey.

4. Response

The complete results of the survey and a copy of the instrument are provided in the Appendix. Results are summarized as follows:

a. Number of Faculty Completing Questionnaire

Seventy-four percent of the full-time faculty completed and returned the questionnaire. The response rate for part-time faculty was 47 percent. The response rate for each college was approximately proportioned to the size of the programs offered by the college. Although all colleges in the Los Angeles Community College District were surveyed, no one college contributed more than 19 percent of the responses (See Table 1).

As can be seen in Table 2, which summarizes the background of responding faculty, 55 percent of the respondents taught in a Computer Science related area (with 32 percent in Business Data Processing),and 45 percent taught some form of electronics.

The faculty indicated considerable experience in their fields, averaging 10 years of teaching experience, with 81 percent reporting they work as consultants in their fields.

b. Faculty Evaluation of Existing Programs and Need to Expand

Computer Science programs were rated good to excellent by 68 percent of the responding faculty and 95 percent indicated a need to expand the existing program.

Electronics programs were rated good to excellent by 89 percent of the responding faculty with 82 percent indicating a need to expand.

c. Methods of Expanding Programs

Three methods were presented in the survey:

(1) Add programs, equipment and facilities to existing campuses.

(2) Create programs with equipment and facilities at an off-campus location under the jurisdiction of one or more colleges,

(3) Create programs with equipment and facilities at an autonomous technical institute.

Eighty-one percent of the responding faculty members chose option 1 (i.e. add new programs, equipment and facilities to existing campuses) as the preferred method of expanding the computer science, electronics,and related technical programs in the Los Angeles Community College District. Eight percent of the responding faculty favored an off-campus center and 11 percent favored the establishment of an autonomous institute.

d. Estimated Effect of an Off-Campus Center or Autonomous Institute on the Department's Current Program

Forty-six percent of the responding faculty believed that an off-campus center would have no effect or a beneficial effect on existing programs at their institutions. Fifty-four percent believed that it would have a harmful effect.

Faculty who thought that an off-campus center would be detrimental to existing programs cited reasons including (1) the separation of high technology programs/courses from general education courses; (2) the loss of funds, expertise and students from existing programs.

Those who believed that an off-campus center would have no effect or a beneficial effect cited as reasons: (1) availability of updated equipment to District colleges; and (2) opportunity for participation by current colleges.

e. Courses, equipment, facilities, and personnel indicated by respondents as being required to update or improve current programs are listed in the Appendix.

f. Preference Rank Order of Curriculum Changes

Faculty were asked to rank 17 options for specific curriculum program and delivery changes. There complete rankings are presented in Table 3. Updating existing equipment and the purchase of new equipment was ranked first in preference by the faculty. Lowest priorities were given to improving retention strategies and the recruitment of minorities, women,and other groups underrepresented in technology programs.

g. Preferred Professional Activities

Faculty were asked to indicate from a list of seven professional activities ones in which they would like to participate. The complete results are presented in the Appendix. The most interest was for release time to attend seminars in new developments in their fields, followed by released

time to participate as a faculty extern to update personal expertise at an industry site. The least interest was indicated for released time for student recruitment.

Summary

A total of 248 faculty (89 full-time and 159 part-time) were surveyed. Respondents indicated an average 10 years of teaching experience, with 81 percent doing some consulting in their teaching field. Faculty gave high ratings to existing programs. Among the options for expanding technical education offered by the survey, faculty indicated strongest support for Option I (i.e. strengthening and expanding existing programs). Substantiating this response, the faculty indicated need for new equipment and more instructors to strengthen existing programs.

TABLE 1

RESPONSE BY COLLEGE TO FACULTY QUESTIONNAIRE

	Percent of Total Response		
City	14%	Southwest	5%
East L. A.	9%	Trade-Tech	19%
Harbor	7%	Valley	13%
Mission	3%	West L. A.	15%
Pierce	16%		

TABLE 2

BACKGROUND OF RESPONDING FACULTY

Departments Represented			
Business Data Processing	32%	Aviation Maintenance Tech	7%
Electronics	21%	Computer Maintenance Tech	5%
Computer Science	18%	Other	4%
Electronics Technology	11%	Consumer Electronics Tech	1%
		Aircraft Electronics	1%

Experience	
Teaching (Average years)	10
Working or Consulting in Field	81%

TABLE 3

PREFERENCE FOR CHANGES IN CURRICULUM, PROGRAMS, AND DELIVERY METHODS

Mean Rank for Each Item is Listed. A Lower Rank is the Most Preferable			
Update or Add New Equipment	(2.15)	More Flexible Course Scheduling	(3.71)
Add Instructors	(2.74)	Diagnostic Testing	(3.74)
Add New Courses	(3.12)	Saturday Classes	(3.92)
Update Curriculum	(3.17)	On-Site Industry Training	(4.04)
Develop Remedial Courses to Prepare Technical Students	(3.41)	Close Industry Liaison	(4.13)
More Flexibility in Curriculum Delivery	(3.59)	Faculty Development	(4.26)
Change Curriculum	(3.67)	Increased Counseling	(4.26)
		Better Retention Strategies	(4.89)
		Recruit Minorities/Women	(5.00)

B. STUDENT SURVEY

This section summarizes the results of the supplemental survey of student opinion at the six colleges in the Los Angeles Community College District not covered by the original San Fernando Valley survey presented in Meeting Technical Education Needs: An Industry Responsive Model, (September 23, 1981). Where appropriate comparisons are made between the results of the original survey and the supplemental survey.

1. Purpose

The questionnaire sought to assess student opinion in four areas:

a. The quality of the existing programs in computer science, electronics, and related areas

b. Reasons for selecting a particular college

c. Preference for additional forms of curriculum delivery (e.g. short term classes, industry locations)

d. Willingness to attend a technical institute

In addition, demographic data (e.g. sex, age, ethnicity, employment) were also collected.

2. Target Population

Students currently enrolled in computer science, electronics, or related technical fields at City, East, Harbor, Southwest, Trade-Technical, and West Los Angeles Colleges were sampled.

3. Procedures

The survey instrument used in the needs assessment of the San Fernando Valley was modified to be appropriate for the expanded target population.

Courses offered during the Fall semester of 1981 in the above specified departments were identified as to their Student Accountability Model (SAM) classification.

Courses from the "Possible Occupational" (D), "Clearly Occupational" (C), and "Advanced Occupational" (B), categories were sampled. Courses in classifications of "Apprenticeship" (A) and "Survey or Exploratory" (E) were not surveyed. Classes were stratified on SAM classifications to insure sampling the full range of course difficulty. The courses sampled included day, evening, and non-traditional scheduling e.g. Saturday, Friday evening, and short term classes. Courses to be surveyed were distributed among as many different faculty as possible, thus avoiding a bias intro-

duced by the same faculty member teaching serveral of the courses surveyed. Ninety-four classes were identified to be surveyed.

Instructors of the classes to be surveyed were initially contacted via a memorandum issued by the Feasibility Study Project Director. The surveys were then sent to each faculty member by courier mail.

4. Responses

A complete set of the student responses and a copy of the questionnaire are provided in the appendix. Seventy-two percent of the 94 classes identified returned a total of 1,450 surveys. Forty-five percent of the respondents were enrolled in electronics courses, 30 percent in business data processing, 13 percent in computer science. Other courses comprised 13 percent of the respondents. (See Table 4)

Electronics accounted for the greatest single number of majors (36%) followed by business data processing (22%) and computer science (12%). As these numbers are generally proportional to the courses surveyed, the populations of those courses should be representative of the students in the various majors.

a. Student Background

Students responding had taken an average of five courses in the surveyed field. Thus, their responses are based on considerable experience with the programs. This is identical to the findings of the San Fernando Valley survey.

Thirty percent (30%) of the respondents indicated that they were currently employed in a industry related to the fields in which they were taking classes. This is comparable to the 36 percent of the respondents to the San Fernando Valley survey which were employed in the field. Those students who were employed worked an average of 27 hours per week again matching the San Fernando Valley survey. The mean student age was 27 years old again matching the San Fernando Valley survey. Sixty-nine percent (69%) of the respondents were male which was less than the 75 percent male respondents in the San Fernando Valley survey (See Table 5). Six percent (80 students) described themselves as physically disabled. The racial/ethnic composition of respondents was 27 percent Black, 22 percent Asian, 21 percent Hispanic and 20 percent White.

b. Student Reasons for Enrollment in Classes

Students expressed the following as the primary reasons for enrolling in the surveyed classes: (1) to complete a two-year vocational program (36%); (2) to transfer to a university (29%); (3) to improve work skills (21%). Therefore,

vocational motivations are certainly the most common reasons for students enrolling in these high technology programs.

c. Student Evaluation of College Programs

Seventy-seven percent, (73 percent in Computer Science and 80 percent in Electronics,) of the responding students rated the courses in the department as good or excellent. Considering that the responding student had taken an average five courses in the field, the expressed rating of the course quality has greater validity.

d. Student Reasons for Selecting a Particular College

Students were asked to indicate reason(s) for choosing a program at the particular college they attend. The complete results are presented in Table 6. Seventy-two percent (72%) listed proximity as a reason while only 10 percent cited the uniqueness of the program.

e. Preference for Additional Methods of Curriculum Delivery

Students were asked to rank alternative curriculum delivery methods according to the student's desire to participate in the activities. Complete results are presented in Table 7. Short-term classes were attractive to 47 percent of the respondents. Equally desirable were classes at industry sites, 46 percent. Individualized open-entry courses (35%) and Saturday or weekend classes (33%) were also endorsed by many of the respondents. However, only 18 percent indicated a desire to take afternoon classes.

f. Student Interest in Attending a Technical Institute After Completing Present Program

Fifty-one percent of the respondents indicated a desire to continue their studies for greater specialization at a technical institute. Only 11 percent were certain that they would not attend. The remainder (39%) were unsure at the time of the survey. Those who indicated a desire to attend a technical institute projected a willingness to travel an average of 12 miles one way to attend classes. This was considerably higher than the reported average commute of 6.4 miles to attend their present college.

Summary

A total of 1,450 students in 94 classes in 10 departments were surveyed. Results are based on a 72 percent response rate. A high level of participant satisfaction with existing courses was found and vocational goals were the primary reasons for enrolling in courses. Proximity of the college to home/work was a primary reason in selecting a particular institution. High interest was indicated for short-term classes and classes offered at industry sites. Substantial interest was indicated in furthering their education by receiving specialized training at a technical institute following program completion at the current institution.

TABLE 4

PERCENT OF TOTAL RESPONDENTS TO STUDENT QUESTIONNAIRE BY DEPARTMENT

Computer Science	13%	Computer Maintenance Tech	4%
Business Data Processing	30%	Electronics Engineering	3%
Electronics	45%	Consumer Electronics Tech	2%
Aircraft Electronics	1%	Aviation Maintenance Tech	1%
Electrical Engineering	1%	Other	1%

TABLE 5

THE FIRST SURVEY WITH THE SUPPLEMENTAL SURVEY

	San Fernando Valley Colleges	Los Angeles Colleges
Mean number of Courses	5	5
Currently employed in the field	36%	30%
Average hours of employment/week	26	27
Mean student age	26	27
Percent of Students completing survey		
Male	75%	70%
Female	25%	30%
Taking course for vocational reason	61%	59%
Percent rating good to excellent		
Computer Science	73%	73%
Electronics	69%	80%
Miles traveled to college	9	6
Miles willing to travel to Technical Institute	11	12

TABLE 6

STUDENT REASONS FOR SELECTING A SPECIFIC PROGRAM/COLLEGE

College close to home/work	72%
Program reputation	36%
Classes at convenient times	33%
Low cost	30%
Instructor reputation	24%
College reputation	23%
Only local college offering program	10%
Other	3%

TABLE 7

STUDENT PREFERENCES FOR CURRICULUM DELIVERY METHODS

Short-term (less than semester) classes	47%
Classes at industry locations	46%
Individualized classes (open entry)	35%
Saturday/weekend classes	33%
Skill building courses (English, math)	26%
Afternoon classes	18%
Other	5%

C. Summary Report on the Status of Existing Programs

Introduction

This section of the supplement describes the District's existing programs in Electronics, Computer Science and Business Data Processing. Both qualitative data based on interviews with department chairpersons and quantitative data provided by the Educational Services Division, primarily the Office of Educational Planning and Resource Development, have been included.

1. Procedures

Individuals responsible for the operation and future development of targeted programs were interviewed. Whenever the programs existed as a separate department, the chairperson was interviewed. When the programs were part of a larger department, then the chairpersons of these departments were contacted and they in turn generally directed the interviewer to a senior instructor(s) in charge of the Electronics, Computer Science or Business Data Processing Sections.

A structured interview format consisting of a series of questions, designed to collect necessary information, was developed. Identified individuals were contacted and interviewed. Additional information was obtained by phone in subsequent interviews. In order to present an accurate report of the programs, faculty responses given at the interviews were transcribed into rough drafts which were then returned to the interviewees for their comments, additions, changes or deletions. These revised program descriptions are provided in the Appendix.

Individual responses to questions have been summarized in this section along with quantitative data collected from the Division of Educational Services.

2. Programs

a. Enrollment

Eleven Electronics and nine Computer Science-Business Data Processing Departments were interviewed. (Included in the Electronics interviews were the Aviation Electronics Programs at the Airport Center and at Mission College.)
Throughout the District, the interviews revealed that the enrollment demand greatly exceeds enrollment capability. A comparison of the Fall 1981 first census enrollment to the recommended class size documents that many courses in Electronics and Computer Science had first census enrollments exceeding their class limits, thus indicating an overenrollment condition. Specifically, in Electronics, eight of the eleven departments have 93 classes overenrolled out of a total of 288 classes (32%). In Computer Science-Business Data Processing, eight out of the nine departments had 166 classes overenrolled out of 332 total classes (50%). Chairs reported a tendency to deliberately overenroll classes in order to allow natural attrition to lower the enrollment to the class size

limit by the semester's end. These initially overcrowded conditions may contribute to a high attrition rate (reported to be 40 percent to 50 percent during the first year) and thus become a self-fulfilling prophecy. This overcrowding was further supported by 12 of the 20 individuals interviewed who commented that their labs were overcrowded. The report of the Technical Education Task Force of September 23, 1981 pointed out that San Fernando Valley Colleges' department chairs estimated that as many as 500 to 1,000 additional students would enroll if facilities permitted.

b. Weekly Student Contact Hours

By all measures available, the existing Computer Science, Business Data Processing and Electronics programs are among the strongest in the District. In terms of growth in Weekly Student Contact Hours (WSCH), Computer Science and Business Data Processing have grown by 22 percent from Fall 1980 to Fall 1981; and 40 percent from Fall 1979 to Fall 1981. Fall 1979 to Fall 1981 growth rates ranged from a low of 9 percent at City College to a high of 193 percent at Mission College. The WSCH growths are considerably greater than the districtwide 1.5 percent growth from Fall 1980 to Fall 1981 and 2.7 percent from Fall 1979 to Fall 1981. (See Table 9 for WSCH and enrollment data for Fall 1981).

From examination of the 1982-87 College Master Plans, it is noted that major expansion changes in Computer Science and Business Data Processing are among the highest ranked in priority by the colleges. For example, the changes in this discipline were given a priority ranking of: 4 at City, 1 and 2 at East, 2 and 4 at Southwest, 1 at Trade-Technical College and 3 at West Los Angeles College. Many of these proposed major changes involve the implementation of new programs in Computer Technology, Microprocessing and general instruction in Business Data Processing.

Fall 1980 WSCH per full-time faculty equivalent (WSCH/FTE), a measure of program efficiency, was 557 for Computer Science and Business Data Processing and 506 for Electronics. Both were considerably above the District average of 465.

As part of the Master Plan process programs project their anticipated WSCH growth and WSCH/FTE. In Fall 1980 colleges projected the WSCH generated by Computer Science and Business Data Processing would increase by 8.3 percent by Fall 1981. The actual growth which occurred was 22.4 percent. Therefore, these programs are growing faster than anticipated. The Master Plan also projected a 28.2 percent growth from 1980 to 1986. Based upon the observed 1980-81 growth rate this projection is very low. A more realistic anticipated growth may be 50 to 60 percent. Of course such growth would be restricted by available faculty, equipment and facilities. A similar although less extreme pattern is seen in Electronics. A Fall 1980 to Fall 1981 WSCH growth of 2.2 percent was projected. However, an actual growth rate of 14.5 percent was observed in Electronics. Thus, both Computer Science and Electronics are exceeding projected Master Plan growth rates.

As a result of the rapidly growing WSCH production and above average efficiency (among other criteria), the Educational Planning Office has developed prioritized recommendations for programs. Computer Science, Business Data Processing and Electronics programs have consistently been recommended for expansion and frequently with highest priority.

In summary, all quantitative measures and extrapolations indicate the existing Computer Science, Business Data Processing and Electronics programs are growing, viable, efficient and warrant expansion.

3. Remedial Programs

Ten of the Electronics and seven of the Computer Science-Business Data Processing interviewees said their students need more preparation in English and math. At present, only three Electronics and three Business Data Processing Departments test their students prior to entering to determine their basic skill level. For individuals weak in basic skills, a variety of remediation methods are used by the programs. They include:

a. Sending students to the Learning Resource Centers.

b. Sending students to the appropriate division (English or math).

c. Referring the students to a tutor in the Computer Center.

d. Some combination of the above.

One department, Electronics at Trade-Technical College, has a separate remedial program. This Electronics Assistant Program includes math, English, and an overview of Electronics. Fifteen percent of the students who enter this program eventually complete the Electronics program.

4. Placement

The placement rate of those students who complete one-year certificates or two-year degrees is almost 100 percent in Electronics, according to the eleven department chairs. The nine Business Data Processing Departments reported 80 percent placement. The above data is admittedly an estimate because no department keeps records on their graduates. Both Electronics and Business Data Processing report that their students obtain employment in one of the following ways; through full-time faculty with industry contacts; through part-time faculty; Advisory Committee members; former students; and students make their own contacts.

5. Faculty

All of the interviews indicated the faculty are current in their knowledge of the field. The part-time faculty, who frequently are employed in industry, maintain current expertise through their industry activities. Full-time faculty were reported to maintain their "state-of-the-art" knowledge through various means, including seminars, industry literature, and consulting.

A shortage of faculty was reported. Nine of the eleven Electronics and six of the nine Computer Science Departments expressed a need for additional faculty to teach overcrowded programs (20 FTE in total). The faculty shortage was in part attributed to salaries not being competitive with those paid by industry for comparable skills.

6. Delivery System

The primary teaching mode used by faculty throughout the District is a traditional lecture and lab approach. Theory is provided by lecture and students get "hands-on experience" in the labs. This delivery system is used by all Electronics and Computer Science-Business Data Processing programs. There are, however, a few innovations or deviations from the traditional system. Specifically, Harbor College has incorporated an "open" policy for the Electronics laboratories. Computer classes at West Los Angeles College are taught with each student using a terminal. Both Aviation Electronics at the Airport Center and Mission College use six-week modular courses. Trade-Technical and City Colleges have both initiated afternoon classes. City College has also provided weekend classes and has experimented with short term (six-week) intensive courses; however, the college has experienced difficulty in initiating these changes from traditional class scheduling.

7. Equipment

Both Electronics and Computer Science programs were characterized as requiring large amounts of expensive equipment to provide students with hands-on experience. This problem was said to be exacerbated by the fact that equipment in these fields becomes obsolete rapidly.

Approximately half the departments (seven in Electronics and five in Business Data Processing-Computer Science) reported needing more equipment, either to provide instruction to a larger enrollment, replace obsolete equipment, or update their programs with new specialty equipment such as microcomputers. Equipment used by industry is not considered a viable-source of equipment because all except two departments (Pierce College's Computer Science and City College's Electronics) indicate that the few donations received from industry were old or out-of-date. Vocational Education Act funds for new equipment averaged $79,830.00 for each of the nine Electronics Departments over the last three-years (1979-1982). The two departments not receiving VEA funds were West Los Angeles College and Mission's Aviation Electronics Department which is not eligible until it develops a full two-year program. Five Computer Science-Business Data Processing Departments received VEA funds averaging $44,107.00 for each department.

8. Facilities

In addition to complaints of out-dated equipment, several departments commented on the lack of space. Three Electronics and five Computer Science-Business Data Processing Departments said they need more and/or larger classrooms. Seven Electronics and seven Data Processing

Departments complained of inadequate lab space. Some Electronics Departments reported teaching 35 to 40 students in labs with only 25 work stations. Other departments reported that the few available computer terminals were so overused that some students were unable to do their homework and consequently had their grades lowered.

9. Coordination Between Colleges in the LACCD

There is very little coordination among the Electronics Programs at the various Los Angeles Community Colleges. The most noteable exception is the Airport Center which works in conjunction with Mission College's Aviation Electronics program. There is no districtwide Electronics Coordinating Committee, although a few instructors expressed a need for one. Business Data Processing has a Business Data Processing-Computer Science Committee that serves as an advisory committee to the Educational Services Division. Most of the limited intercollege coordination of programs that does exist seems to be on an informal basis.

10. Coordination with Industry

Interviewees reported that they have close relations with local industry. Relations are maintained through several avenues, one of which is Advisory Committees, which meet annually to help with curriculum development, choice of equipment and placement of students. Close industry relations are also in part due to part-time instructors who frequently are employed in industry, and full-time faculty who consult for industry.

Another method of promoting close industry relations is contract education. At present, City, Valley and Trade-Technical Colleges have contract education with industry while Pierce College and East Los Angeles College teach on-site classes.

11. Expansion

When asked what areas of their programs needed expansion, the chairs discussed their need to expand existing programs as well as add new ones. The following table identifies the areas each college wants to expand. The table displays the broad spectrum that Electronics and Computer Science/Business Data Processing cover. A strong common theme was the need to add courses in microcomputers and microprocessors. Also prominent was the mention of new programs in lasers, fiber-optics and satellite communications.

Summary

The interviews with the department chairpersons reveal that the District's Electronics and Computer Science-Business Data Processing Departments have many overenrolled classes and labs. There is little testing of entering students and remedial education is handled by the learning centers.

It was reported that there are high attrition rates, especially in the beginning classes. However, the graduates of the programs have extremely good placements. The chairpersons indicated a need for more full-time faculty in their departments. The chairpersons also indicated the faculty maintain familiarity with current developments in their fields. The traditional methods of instruction typically used by faculty although some innovative methods have been initiated. Most departments report experiencing a severe shortage of equipment.

Beyond the informal level there is very little coordination between campuses. Although the departments describe close ties to industry through their Advisory Committee's and part-time faculty, there are very few programs involving direct industry contact such as on-site classes.

Chairpersons consistently reported a need to expand existing programs to meet the demands of overenrollment, and a need to develop new programs in emerging areas.

Table 8

PROGRAM EXPANSION PLANS REPORTED BY CHAIRPERSONS

Campus	Business Data Processing Computer Science	Electronics
City College	Integrate Accounting with Data Processing. Add courses in microcomputers used by management & small businesses.	Expand Microprocessor offerings & add Microprocessor Repair offerings.
East L. A. College	Add courses in Microcomputers, basic programming for home computers and Auto Computer repair.	Add Laser, Fiber-Optics; expand Digital and Satellite Communications offerings.
Harbor College	Develop districtwide plans for future development in the field & use of computers in teaching.	Expand Electro-Mechanical option and Computer Technology. Develop new Computer Technology & Solar Energy programs. Add Energy Management.
Mission College	Add an option in Computer Maintenance; develop analyst and data base aspects of the program.	Develop the new programs in Electronics & Aviation Electronics. Expand one-year offerings into two-year programs for the above courses.
Pierce College	Decentralize computer facilities on their campus.	Expand programs in Communications & add Fiber-Optics & Lasers.
Southwest College	Add courses in Data Entry, Computer Operations & Data Communications.	Form a separate Electronics division & add one-year certificate programs. Expand entry level offerings.
Trade-Technical College	Establish a Campus Computer Center merge Word Processing & Data Processing.	Add Laser, Opto-Electronics & Microprocessors. Expand the Electronics Engineering Technician's program.
Valley College	Set up internship programs with business and industry.	Add new programs as new fields blossom; Automotive Electronics, Digital & Satellite Communications & Electro-Optics. Expand video and audio Consumer Electronics, Microcomputers & Microprocessors.

Campus	Business Data Processing Computer Science	Electronics
West L. A. College	Add courses in Data Communications, Pascal & Realtime Computer Programming.	Meld hardware & software; add Laser & Electro-Medical, Expand Television and Digital offerings.
Airport Center	No program	Add CAD/CAM & Marine Electronics.

Table 9

ENROLLMENT AND WSCH FOR FALL 1981 BY DEPARTMENT (First Census Figures)
(Includes overenrolled classes* and total classes)

Business Data Processing-Computer Science	City	East	Harbor	Mission	Pierce	South-west	Trade-Technical	Valley	West	Airport Center	Mission
Enrollment											
Day	688	858	695	80	1478	404	807	1058	441		
Evening	718	1141	811	400	1169	468	681	1326	723		
Total	1406	1999	1506	480	2647	872	1488	2384	1164		
WSCH											
Day	1992	2557	1891	190	5521	1104	2584	3174	1323		
Evening	2154	3385	2433	796	4173	1476	2196	3978	2169		
Total	4146	5942	4324	986	9694	2580	4780	7152	3492		
Overenrolled Classes											
Day	5	8	7	1	20	6	12	13	5		
Evening	5	16	3	3	21	7	11	13	12		
Total	10	24	10	4	41	13	23	26	17		
Total Classes											
Day	19	20	23	4	32	11	19	26	9		
Evening	13	32	8	15	32	9	16	30	14		
Total	32	52	31	19	64	20	35	56	23		
ELECTRONICS										Aircraft Electronics	
Enrollment											
Day	1047	653	329	00	842	136	1618	316	30	54	9
Evening	464	556	111	78	970	103	417	724	257	12	0
Total	1511	1209	440	78	1812	239	2035	1040	287	66	9
WSCH											
Day	5860	1959	1584	000	2866	519	10790	948	90	1080	200
Evening	2382	1668	525	234	3081	398	2070	2370	1143	72	0
Total	8242	3627	2109	234	5947	917	12860	3318	1233	1152	200

Electronics	City	East	Harbor	Mission	Pierce	South-west	Trade - Technical	Valley	West	Aircraft Electronics Airport Center	Aircraft Electronics Mission
Overenrolled Classes											
Day	18	10	3	0	3	1	20	2	0	1	0
Evening	8	5	1	0	6	1	7	6	1	0	0
Total	26	15	4	0	9	2	27	8	1	1	0
Total Classes											
Day	37	18	26	0	29	5	55	10	1	4	1
Evening	9	14	10	3	23	3	13	18	8	1	0
Total	46	32	36	3	52	8	68	28	9	5	1

TOTALS FOR ALL DEPARTMENTS

	1st Census Enrollment	1st Census WSCH	Overenrolled Classes	Total Classes
BDP/CS	13946	43096	166	332
Electronics (Including Aviation Electronics)	8726	39840	93	288
TOTAL	22672	82936	259	620

* Classes in which 1st census enrollment exceeds class limit.

III SUMMARY REPORT ON OTHER INSTITUTIONS

Introduction

The purpose of this section of the supplement is to present how non-LACCD institutions are meeting educational needs in high technology. More specifically, the study sought to determine the following:

1. What needs are being met?
2. What kinds of programs are being taught?
3. How are programs being taught?
4. What kind of success do these programs have?

This section continues the report in Meeting Technical Education Needs: An Industry Responsive Model (Section E, "Impact on Other Institutions" pp. 54-59). However, the emphasis is no longer on impact, but on the different ways that institutions meet the various needs of technical education.

A. Survey of Non-LACCD Programs in Electronics and Computers Service

1. Target Groups

The following schools and colleges were studied:

a. Los Angeles Unified School District

(1) Regional Occupational Programs (ROP)

(2) Community Adult Schools

(3) Adult Basic Education (ABE)

b. California State University, Los Angeles

c. Other Community College Districts

(1) Santa Monica City College

(2) El Camino Community College

d. Proprietary Schools

(1) Edison Technical School

(2) National Technical Schools

(3) Computer Training Center

e. Northrop University

f. Urban League Training Center

2. Procedures

School catalogues or brochures were collected and studied for the needed information. Directors, chairs, or other responsible people were interviewed in person or by phone and were each asked questions from a formal written questionnaire.

3. Summary of Reports

The complete reports appear in the Appendix. The following is a short summary of each outlining their main characteristics.

a. Los Angeles Unified School District

To supplement this section on the Regional Occupation Centers and the Skills Centers in the study, we have added a report on the Regional Occupational Programs, Adult Community Centers and the Adult Basic Education program.

Regional Occupational Programs (ROP) are directed only to high school students. Innovative methods (on-site training and mobile instructors) are employed in an effort to provide short-term training for immediate employment. The other two programs, the Community Adult School and the Adult Basic Education Program, provide remedial education to the adult learner (18 and over) in order to improve basic skills and to provide an opportunity to receive a high school diploma.

The unique aspect of all the LACCD programs is that they use innovative methods to teach the non-traditional student. Following are some of their characteristics:

They focus on basic skills as well as on specific job skills. Courses include those that train for entry-level jobs and for upgrade. Many of the programs allow for continuous enrollment, are competency-based, and provide counseling and job placement.

b. California State University, Los Angeles

The program in Computer Science at CSULA is very

similar to the one at CSUN described in the earlier study. Programs are taught on a high theoretical level that require a prerequisite of two-years of Algebra and one year of Geometry and Trigonometry. The graduates of this program tend to work for science-oriented industries such as Lockheed and Hughes. Major problems are the shortage of qualified instructors and the need of costly equipment for the program.

c. Other Community College Districts

Both the Electronics and the Business Data Processing Departments were studied at Santa Monica College and El Camino Community College. All four departments interviewed present a picture almost identical to the one at the Los Angeles Community College District:

(1) Overenrolled classes

(2) Shortages of equipment and facilities

(3) Limited funds

(4) Similar student clientele

(5) Similar teaching methods

(6) Similar academic levels

(7) Little involvement in contract education

(8) Difficulty in holding qualified instructors due to high salaries in industry.

d. Proprietary Schools

Edison Technical School, National Technical Schools and Computer Training Center are private schools whose programs are less theoretical than those at the community colleges, having no math or general education requirements. All three specialize in short, intensive technical programs at extremely high cost to the student. There are, however, many students that are willing to pay this high cost in order to begin working sooner and thus start earning a salary. Another advantage to these programs is that they generally start several times a year, usually every one or two months. Both Edison and National teach in

English, but the Computer Training Center with a mostly Spanish-speaking population of foreign students trains in Spanish.

e. Northrop University

Northrop University has two primary divisions, Engineering and Technical Training. Seventy-five percent of its students are foreign students. Northrop has a Language Institute (NULI) that helps prepare its students in English so they can enter the various programs and progress through the courses. The unique aspect of Northrop is that it succeeds in training foreign students in high technology fields, such as Aviation Electronics and Computer Technology, and with the aid of its Language Institute it manages to do this in English. For the twenty-five percent American students, Northrop has an Institute that teaches English, math and physical sciences to prepare students to enter the regular program. (This program lasts one quarter.) Many of Northrop's programs in the Institute of Technology are on the same level as the Los Angeles Community College District.

f. Urban League Training Center

This is a school that prepares unemployed, under-employed Black students for jobs in Computer Programming. It is entirely funded by several local businesses and industries and has extremely close relations with them; often an industry representative is the instructor. This close relationship along with very small classes enables the Center to have an extremely high placement rate. Included in the training are such important things as what an employer expects from an employee, and how to have a successful interview. The student is expected to treat his school experience as if he were at an actual job.

Conclusion

The twelve reports in the Appendix present a picture of technical education that is extremely varied, running the gamut from a short course at a ROC center to a Bachelor's Degree at CSULA. The community college fills the educational needs in the large area found between these two extremes.

IV. FUNDING

A. California Worksite Education and Training Act Program Plan
Total amount $3,000,000.00

The District has been awarded a grant by CWETA to provide employment based training over the next 30 months. These funds will be drawn upon as individual projects are finalized, reviewed, and approved. This is a major new approach to conducting CWETA projects. Rather than funding individual company contracts on a piece meal basis, this grant provides an umbrella approach to administering a network of CWETA projects in electronics, computer science and related fields.

1. Target groups

   CWETA trains people who are economically disadvantaged, youth, displaced workers, people who are disabled,and individuals with inadequate or obsolete job skills.

2. Training

   Specific training plans will be developed with each company or consortium of companies to address their particular needs for entry level or upgrade programs. Instruction will take place at industry sites, at a facility leased under the CWETA project, and at college campuses. The feasibility of mobile laboratories using trailers or semi-trucks is being explored. When appropriate, college credit will be granted through one or more of the colleges.

3. Entry-Level Programs - Entry-level programs are geared to help unemployed individuals enter the work force. Training is delivered in the traditional training mode where a supervising instructor works closely with small groups of trainees. Students proceed through a series of skill-building processes. The training process also emphasizes work attitudes and responsibility. Standards and schedules similar to those in an actual work environment are rigorously enforced. Careful attention is given to problems associated with a commitment to daily work.

4. Upgrade Training - Upgrade training allows employees with entry level skills to upgrade into mid-technical level positions. It offers a career option for first echelon levels workers. Upgrade training is organized around modules with an emphasis on skill achievement. Student-employees work within a module, not on a time frame basis but on a specific job skill attainment basis. Progression from one module to the next depends on the evaluation of the completed prerequisite module.

5. Custom Training - Custom training is aimed at a specific demand area. The Community Colleges in cooperation with the employer develop a curriculum aimed at the specialized area either at entry level or at upgrade level and develop a delivery mode suited to that specific curriculum.

6. Training Consortium Model

As all practicing technicians have a common based of knowledge from which growth takes place, curriculum may be aimed toward a consortium of companies. This general upgrade curriculum emphasizes all the elements of fundamentals rather than the specifies of a particular application. Training depends on the cluster of companies participating, their geographic location and the number of employees. In this way, companies with small numbers of employees may take advantage of this training opportunity.

7. Worksite/On-the-Job Training

Worksite (on-the-job) training will be an integral part of all four types of programs.

CWETA is a three-year old program which combines classroom instruction with on-the-job training in high demand occupations with career potential. CWETA projects have focused primarily on the health occupations and electronics industry. CWETA projects involve an employer who commits to hire entry-level trainees or promote upgrade participants, the company's collective bargaining agent, an educational deliverer such as a community college district, and local agencies including the Employment Development Department, Division of Apprenticeship Standards, and Department of Rehabilitation. The Los Angeles Community College District has previously contracted with CWETA for four individual projects including:

Joint nursing upward mobility project with County/USC Hospital

Rockwell Tooling Operator Program

Kaiser Nurses' Training Program

ITT - Neodyne Machine Operator Program

It is expected that this CWETA project will establish the working relationship necessary to continue collaboration between the Los Angeles Community College District and local companies after CWETA funding terminates. After that time, training could continue through contract education.

B. Federal Proposals

1. Fund for the Improvement of Postsecondary Education
Term of the grant: three years. Total amount: $339,737.00. This proposal requests funds from FIPSE to develop microcomputer technology curriculum, intended for the training of technicians, as a joint effort between faculty and industry representatives. Curriculum will be designed as competency-based modules which can be applied to a learner centered self-paced program. The curriculum will be translated for computer interactive video stations to be placed on campuses to supplement instruction, at the worksite and at regional locations.

2. Title III - Strengthening Program on Behalf of Trade-Technical College
Term of the grant: seven years. Total amount: $5,116,962.00. This major proposal requests funds to strengthen Trade-Technical College in several areas, all with the goal of providing greater access to quality education in high technology fields. Funds are requested for development in six key areas:

a. Faculty Revitalization - programs and activities will be instituted for faculty to increase awareness of new developments in their fields, and for faculty and staff to increase understanding of their student population.

b. Pre-Technical Curriculum Component - a comprehensive pre-technical skills component (reading, writing, mathematics, oral communications and survival skills) will be designed as competency-based modules which can be applied to a learner centered-self-paced program. The goal is to establish a core program for remediation.

c. High Technology Curriculum - Innovative curricula will be developed as a joint effort between Trade-Technical College's faculty and industry representatives in the following programs:

(1) Electronics Engineering Technology

(2) Electrical Engineering Technology

(3) Computer Assisted Manufacturing (CAM)

(4) Computer Assisted Design/Computer Assisted Manufacturing (CAD/CAM)

(5) High Technology Support Services

The workshop aspect of this activity is a significant part of the Faculty Revitalization component.

d. Resource Development - This activity is designed to:

(1) establish a resource development office at Trade-Technical College and at a Center for High Technology to prepare for the solicitation of outside funding from the private and public sector.

(2) establish effective liaison between this institution, and business and industry especially in high technology.

e. Institution Management

Activities will be planned to orient management to the breath of the grant activities and to provide a student centered approach to management techniques.

f. Student Services

Funds are requested to revitalize existing student services, and to develop additional services in conjunction with new high technology curriculum.

C. Instructional Improvement Grants

1. Triligual Orientation and Survival Skills
Term of the grant: one year. Total amount: $28,000.00.

This project will modify existing material and develop new curriculum for orientation and survival skills directed towards EOP & S, Handicapped, VEA, limited English speaking, re-entry women and other diverse student populations. Initially, curriculum will be designed as self-paced, modular units for use in English, and then translated in Spanish and Vietnamese, as funding permits.

2. Computer Interactive Electronics: A Bilingual Pretechnical Course
Term of the grant: one year. Total amount: $29,868.00.

This project will develop a computer interactive bilingual (English and Spanish) course that will prepare the student who requires remedial work for introductory courses in electronics.

D. Contract Education

Contract education exists when the cost of instruction is paid by an outside group, agency, or company, CWETA and CETA are forms of contract education.

Employer funded contract education programs are presently being conducted by City College, Valley College and Trade-Technical College in addition to CETA and CWETA contract programs. Contract education has not been limited to high technology nor to one industry. Among the programs are those in Nursing, Child Development, Tooling, and Typing. Contract education is a productive way of offering courses needed by specific industries to train employees and potential employees.

The Los Angeles Community College District is prepared to take a leading role in working with industry to strengthen technical education and to pursue this funding source for costly technical programs.

While the Task Force recommends making an organized and concentrated effort to work closely with industry in this area, other colleges in California are vigorously engaged in cooperative efforts with industry. One outstanding program, at the College of San Mateo, includes faculty revitalization; instructors are hired by local electronics firms to upgrade their skills and to learn of new developments in their field. Chancellor Gerald C. Hayward at a recent conference, after calling attention to the innovative ways that industry and education are working together, stated that "We are not on the cutting edge of technology. Updating must happen in industry and that will always be the case. A successful technical training program must include a partnership between industry and the community colleges."

The survey of business and industry districtwide revealed that 52 percent of the companies are interested in exploring contract education with a community college. Seventeen percent had a high or very high interest. These figures gain significance since the companies responding favorably represent major industries in this areas with greatest number of employees needing training as well as the largest training budgets. Our initial contact with business and industry for contract education through CWETA reaffirms the potential of this funding source.

E. "Investment In People" Initiative

As part of a statewide program, the Governor has called for major funding for the community colleges for training projects in high technology areas.

Allocations for the following programs have been requested

1. Worksite Training Programs which conform to the CWETA Model - $4,500,000.00

   The objective of this program is to provide an incentive to the community colleges to incorporate industry based worksite education and training into their current occupational programs. Sufficient funds will provide for growth ADA in industry based worksite training to guarantee the continuation and expansion of these training programs.

2. Regional or Districtwide Training Centers/Programs in High Technology Fields- $2,500,000.00

   These funds are earmarked for start-up costs for two or more regional or districtwide training centers in high technology fields. Applicants for these funds shall be multi-college districts or regionally based consortia of college districts.

   Among the objectives of the training centers will be the following:

   a. to develop new programs in high technology fields which have high employment potential to promote industry participation in identifying needed programs, planning curricula, evaluating programs, and placing trainees.

   b. to utilize, as much as possible, industry sites, equipment and expertise to insure "state-of-the-art" training.

   c. to promote non-traditional scheduling and training delivery modes (e.g. year round operation, short-term, open-entry/exit, self-paced and modular instruction).

   d. to provide instruction which overcomes pre-technical skill deficiencies.

   e. to provide opportunities for continuous up-dating and retraining of faculty in high technology fields.

3. Leveraging Business/Industry Support for Job Training in Emerging High Technologies - $2,000,000.00

   Industry participation with colleges in the planning of new or expanded training programs could benefit both in

several ways, including training programs that meet industry needs, professional development for faculty, and shared facilities and equipment.

This funding will cement the education/industry relationship through mutual investment of resources. As federal fiscal policies shift growth incentive resources to the private sector, it is even more incumbent on business and industry than previously to contribute real resources to training programs commensurate with the benefits they receive in skilled personnel.

The objectives will be to train the economically disadvantaged and unemployed.

The targeted training areas are:

a. Computer Aided Machining

b. Digital Logic/Microprocessing Technicians

c. Computer Aided Drafting/Computer Aided Machining (CAD/CAM)

d. Service Technician (Business Machines/Computer Repair)

e. Solar Technology

4. Retraining Displaced Workers - $1,000,000.00

Funding would provide a mechanism to identify the "transferable" skills of displaced workers and retrain them for jobs in high demand occupations. Efforts will be targeted to locations hard-hit by plant closures and mass layoffs.

F. Federal Legislation

1. CETA Type Legislation

A variety of bills are before the House and the Senate requesting funds for education leading to employment and job site training.

a. Hawkins Bill (H. R. 5320) $4,500,000,000.00

$500 million of this money is earmarked for displaced workers. Funds are included for on the job training, and part-time summer jobs for economically disadvantaged youths.

b. Quayle/Kennedy Bill (S-2036) $3,800,000,000.00

$100 million of these funds are for displaced workers. Funds are included for long-term training and on the job training.

c. Jeffords Bill (H. R. 5461) FY 1983 $3,600,000,000.00
FY 1984 $4,000,000,000.00
FY 1985 $4,400,000,000.00

Included in this bill are: internships, classroom training, and subsidized work experience. $63 million is available for such programs as displaced workers.

d. Administration Proposal (S 2184) $1,800,000,000.00 (1983-1987)

$200 million will be targeted for special programs. Displaced workers are one of several eligible populations. It is expected that a compromise based on the three legislative bills and the President's proposal will be made. Education will have the opportunity to have increased funding for programs in technology with high job potential. It is expected that funds will be channeled through the states with an emphasis on local level program management.

2. Defense Industrial Base Revitalization Act (Blanchard/McKinney) (H. R. 5540) $1,000,000,000.00 by 1987 ($250,000,000.00 annually)

This bill directs the President to initiate training and retraining programs which will provide workers with the skills needed to alleviate current manpower shortages and keep pace with rapidly changing industrial technologies.

This bill is a bipartisan effort to recognize vocational and technical education as an instrument to achieve national defense goals. This is a highly significant bill for technical education.

3. Electronics and Computer Technician Education Incentive Grants Act (Miller) (H. R. 5820) $50,000,000.00 (1983)

This bill is designed to help solve a serious national skill shortage by training 80,000 Electronics and Computer Technicians. The U. S. Department of Labor has projected a demand for 1.4 million new Electronics and Computer Technicians over the next ten years. The bill acknowledges that "... vocational education system has not kept pace with rapid technological advances in these industries," and that ".. there

exists the potential for a strong partnership between vocational education programs and private industry to produce the trained technicians for expanding job opportunities."

G. Other Funding Sources

1. Executive on Loan

A proposal is being prepared to secure the services of an expert from a local major industry. This person will work on a full-time basis with the Community College District.

2. The Apple Education Foundation
Foundation for the Advancement of Computer-Aided Education

This foundation awards computer hardware to organizations who want to create innovative methods of learning through low cost technology.

3. The Ralph M. Parsons Foundation

This foundation provides funds to launch new projects in the science and business fields including technology management.

There are numerous other foundations whose potential funding for the Los Angeles Community College District Technology programs appear promising, some of which are mentioned in the first study.

V TECHNICAL EDUCATION OPTIONS

Introduction

Several unstated assumptions were made when the task force was directed to consider the three alternatives:

to expand or strengthen existing programs.

to establish a Technical Institute as an off campus educational center of one or more existing colleges.

to establish an autonomous technical institute.

The first option assumes that whatever is needed for technical education exists in some form in the established programs and should therefore be increased or bolstered in some way. The second two assume the opposite of the first; that whatever is required for technical education demands a new, separate effort at a separate location.

That is not to say that the choice is between strengthening or expanding existing programs and adding new programs and delivery methods. But it is essential for discussion to distinguish between expanding current activities and adding new ones. In our initial report, we identified particular areas of demand that technology is making on education:

1. to provide new programs in high demand fields such as microcomputers, lasers, microwave, opto-electronics, and others.

2. to provide flexible and effective delivery systems for this education.

3. to create closer relationships with industry to enable education to meet the challenge of this technology.

4. to maintain currency in expertise and equipment for rapidly changing technology.

5. to provide opportunities for populations less represented in these high employment fields.

6. to find alternate sources of funding to finance expensive and innovative programs.

If these are areas that technical education should be concerned with, then they must be considered in any evaluation of alternative methods of meeting technical education needs.

Existing Programs

It is essential to recognize that the electronics and computer software and hardware programs differ at each of the colleges. The differences are guided by the expertise and educational philosophy of the faculty as well as by available funds (or lack), and by the availability of equipment. These differences must be considered in evaluating any expansion of programs since expansion at one campus would be essentially different than at any of the other campuses.

There are three major programs under consideration at the campuses: Computer software programs, computer hardware programs, electronics, and such specializations as solar energy and microwave technology. Each of the campuses has a thriving electronics program; however, these programs are not identical. Each college has organized these disciplines in different departments. At City, Trade-Technical, Harbor, and Southwest, the electronics program includes computer hardware technology. Each of these programs is currently developed in varying degrees. Pierce and City College have the most extensive computer hardware programs; while at Harbor and Southwest, the programs are in the development stage. Trade-Technical has an established electronics program. Electronics programs at Valley, West, and East do not include computer hardware. Pierce College is distinctive since its computer hardware program is combined with its software program in their computer science department. Each of the other colleges teaches software either in Business Data Processing or Computer Science Department or both (see the full report of the campuses for more detail).

A. Strengthening of Specific Technical/Vocational Programs in All Colleges

There are three possibilities: 1. Expand programs at each of the nine colleges; 2. Expand selected programs at campuses which appear to have the most promise, need or demand; 3. Create a master plan which designates specialization in various technical areas at specific colleges.

1. Expand programs at each of the nine colleges

Arguments in favor:

a. Because of high enrollments in computer science and electronics programs districtwide, existing programs could be expanded to accommodate increasing numbers of students who want to enter programs which offer high employment potential.

b. There are significant numbers of students who want to enter programs in each of the geographic areas served by the campuses. It would therefore be appropriate to make programs available at each campus.

c. The technical fields that these programs cover are themselves

expanding; if we do not expand programs we will not be providing sufficient educational opportunity for our students and for the community.

d. It is the belief of the professionals teaching in these areas that existing programs need to be expanded (see faculty survey).

Arguments Against:

a. It is not economically feasible to expand programs at each of the colleges because of the high cost of equipment and the limited facilities for expansion. Across the board expansion of programs is too costly; criteria for selection should be determined and prioritized.

b. Because the electronics and computer science programs are very different at each of the colleges, they have different needs. Not all high technology programs can appropriately be added at all campuses.

c. Before considering expanding programs, there is a substantial need at some of the campuses merely to maintain the current level of instruction. Additional faculty are needed; lab space is meager; equipment is broken down or obsolete. These areas should be addressed to prevent further errosion of programs

2. Expand selected programs at campuses based on need, industry demand or promise

Arguments in favor:

a. According to the reports from the campuses, needs exist in each area under consideration: Up to date and workable equipment is needed for basic programs in electronics; expanded laboratory space is needed at some of the campuses in order to maintain current programs. Some departments need additional full-time faculty just to maintain programs. Expansion should be made on the basis of individual need.

b. Individual campuses have developed special programs which have been especially successful. Expansion should be based on a proven track record of success.

c. Those campuses that have exhibited the greatest difficulty have the greatest need for expansion. Among these colleges are those whose facilities and equipment are particularly limited resulting in difficulty in retaining students. Limited flexibility in scheduling classes, with few alternatives to choose from, have likewise created problems in retaining students,

as have departments where there were insufficient numbers of full-time faculty to develop new or innovative programs.

Arguments Against:

a. Under present conditions, there is no mechanism to determine which program should be added to individual colleges. Should innovative programs be placed on campuses which are having problems with their present programs in order to change them or on campuses which are already successful?

b. This approach tends to benefit one campus at the expense of others.

c. Innovative programs should be regionalized throughout the district to provide access to other student populations and to industry.

d. To create specialization at designated colleges cuts off opportunities to students at campuses that will not have these special programs.

3. Create a Master Plan which designates specialization in various technical areas at specific colleges

Arguments in favor:

a. It is essential to recognize that electronics and computer software and hardware programs differ at each of the colleges. These differences must be considered in evaluating any expansion or strengthening of programs since expansion at one campus would be essentially different than that at any of the other campuses.

b. High cost precludes creating new programs at each of the campuses. Programs in new high technology areas should be determined on a districtwide basis predicated on such criteria as proximity to industry; existing resources including faculty expertise; and equipment.

c. Master planning will prevent unnecessary duplication of programs and will assist counselors and students in identifying programs.

d. Not every college can expand programs in all areas of technology; Master planning will enable the district to help provide a fair amount of resources to each college, based on criteria that is agreed upon.

e. It is possible with master planning to create incentives for

program development such as matching funds for departments able to bring in outside resources and/or funding.

Arguments Against:

a. Master planning may be too time consuming. A few campuses have needs that must be addressed in the shortest possible time. In addition, industry requirements must be considered immediately if programs are to educate people for potential employment.

B. Establish a Technical Institute as an off-campus Educational Center under the auspices of one or more existing colleges

Arguments in favor:

1. The most compelling reasons for creating a technical institute (whether autonomous or not) are to:

   a. Bring together innovative programs.

   b. Allow flexibility in program delivery not easily implemented on existing campuses.

   c. Create a special reputation for providing high technology programs which may enable access to special funding and special industry-education liaison.

   d. Regionalize expensive equipment.

   e. Enable close proximity to industry sites.

   f. Allow flexibility in teaching schedules to enable faculty to work more closely with industry.

2. Centralization is an important concept for advanced technology programs. According to the Board's directive of March 11, 1981, "the Institute's objectives would be to centralize highly needed advanced technology programs to respond to the needs of students and the community."

Arguments against:

a. To consolidate innovative programs at one location may tend to benefit one population at the expense of others.

b. Innovative programs should be regionalized throughout the District to provide greater access to industry.

C. Establish an autonomous Technical Instutite

Arguments in favor:

1. The arguments for a technical institute (autonomous or not) are supported by the nature of the innovative programs and delivery method outlined in Meeting Technical Education Needs: An Industry Responsive Model (Sept., 1981).

2. The reasons outlined for (II) Establish a technical institute as an off-campus Educational Center, apply as well to an autonomous institute. The key issues are location(s) and governance, the same issues whether it is determined that existing programs be expanded or that a new institute be established.

   Location(s) determination could be made on proximity to:

   a. student population

   b. industry location

   c. available faculty expertise

Arguments Against:

1. In this time of fiscal restraint, it is not feasible to establish an autonomous institute with the added costs of construction of facilities.

2. Creation of an autonomous institute would concentrate programs at one location limiting access.

3. An autonomous insitute does not address the need for regional and districtwide solutions.

D. Other Considerations

1. Faculty

   At present, each campus reports inadequate funding to hire faculty needed for current programs. Instructors in computer software (Business Data Processing) command substantial salaries in private industry. It appears that faculty at a few campuses have been able through their own perserverance to bring in donations of equipment, software, and arrange for special training at no cost to their college or to the district. Others have initiated new programs. It might be noted that some campuses may not have been able to initiate programs or other activities since they are functioning under certain restrictions such as a very limited number of full-time faculty.

2. Equipment

Determination of equipment for new programs would have to be carefully considered. Some departments have been able to secure donations of good used equipment. Others have had access only to equipment judged as too outdated to be of real use in strengthening programs. All equipment purchased during the last three years has come from Vocational Education Act funds.

3. Facilities

If the objective is to centralize high technology programs as stated by the board, than either a new location or locations need to be determined for an institute; or a campus or campuses would have to be identified as having the facilities in which these programs could be developed.

Study indicates that under present conditions there are no facilities available at any of the district colleges. Space is being utilized to the maximum for the present high demand technology courses. Such colleges as Trade-Technical College are planning courses in the afternoon hours for high vitality technical programs in order to meet demand and to utilize all space; however, laboratory space is crowded at all campuses and in most cases is already being used by students from early morning to late evening.

4. Programs

If new programs in high technology fields such as microcomputers, lasers, solar, and microwave are to be established, how will determination of campuses be decided? The initial study recommends 22 new degree and certificate programs. To establish these programs at each of the campuses would require costly duplication of faculty, staff and equipment. Assuming new fields may not be within existing faculty expertise, additional funds will be required for training and/or additional faculty.

To answer the needs of high technology programs,we recommend a non-traditional calendar structure. Can existing departments modify their program to meet industry requirements for flexibility?

VI RECOMMENDATIONS

The Board of Trustees directed the task force to consider three alternatives:

1. Strengthening of specific vocational programs in all colleges;

2. Establishment of a technical institute as an off-campus educational center under the auspices of an existing college;

3. Establishment of a separate technical institute.

As is discussed in the chapter "Technical Education Options," these alternatives assume that either whatever is needed for technical education exists in some form in the established programs and should therefore be bolstered in some way or that the opposite is true, i.e. that whatever is required demands a new, separate effort at a separate location.

The results of the study argue rather for a combination of these options. The existing programs are good, but suffer under many limitations, and need to be strengthened and/or expanded. On the other hand, many identified needs cannot be easily addressed on a campus by campus basis, and therefore argue for a new approach to promote coordination, cooperation, and expansion into new areas, activities and delivery systems.

The task force believes that the concepts underlying the technical institute originally envisioned by the Chancellor and endorsed in the report Meeting Technical Education Needs: An Industry-Responsive Model continue to be essential:

1. A 12-month operation with open-entry, open-exit course enrollment.

2. A competency-based curricula presented in individualized modules.

3. A variety of instructional strategies.

4. Diagnostic testing.

5. A triumvirate of faculty activities (instruction, curriculum development and professional/growth).

6. Flexible scheduling for faculty.

7. Contract education with business and industry.

8. Rapid response to industry needs.

9. Special outreach programs for minorities, women, disabled and youth.

10. Pre-technical curricula for under-prepared students.

11. Advanced and/or specialized degree and certificate programs.

12. On-going development and industry coordination.

13. Aggressive pursuit of alternate sources of funding.

However, a single "technical institute" either as an off-campus center under the auspices of an existing college or as a separate entity does not address the need for regional and districtwide solutions. Further, the term "technical institute" implies a building in a specific location rather than the envisioned multi-faceted organization using instructional sites throughout the Los Angeles Community College District and offering a variety of services, curricula and delivery methods tailored to specific local needs. This system is more accurately described in terms of "centers."

RECOMMENDATION #1

The task force recommends to the Board of Trustees the strengthening of existing programs. To accomplish this goal, the following is needed:

1. Master planning of high technology programs to avoid unnecessary duplication of high cost programs and to promote development of specialized programs within a region or the district as a whole.

2. Aggressive resource development reflecting the priorities of the master plan.

3. Pre-technical and technical curriculum development.

4. Introduction of innovative delivery systems and schedules.

5. Opportunities for faculty re-training and updating.

6. Identification or development of assessment programs.

7. Increased formal industry/labor liaison.

The development of these programs is expected to encourage cooperation between all colleges rather than competition.

REDOMMENDATION #2

The task force further recommends that as funding allows,Centers for High Technology be established to conduct projects under the California Worksite Education and Training Act, contract education, extension-style workshops and seminars (e.g. computer literacy), and advanced,

specialized or high cost programs which require a mobile or regional approach to extend the program to a broader market.

IMPLEMENTATION

It is proposed that a unit in the Educational Services Division be established to promote the coordination and cooperation needed to strengthen the existing programs and establish and administer the Centers for High Technology and contract education. Coordination with the colleges would be provided through a committee of all college presidents, chaired by the President of Los Angeles Trade-Technical College. Decisions regarding the Centers for High Technology such as program development, grant proposals, locations, and offerings would be under the jurisdiction of this committee.

Because high technology industry within the District is largely concentrated in the West San Fernando Valley and in the international airport area, it is recommended that the first Center for High Technology, funded through the $3 million CWETA grant, be located in a leased facility in the San Fernando Valley. Industry in the airport area will be served through programs in cooperation with the Airport College Center and/or mobile classroom/laboratories.

Because it is the flagship for technical education in the District, the primary identification of the Centers for High Technology for resource development and credit granting purposes would be to Trade-Technical College.

VII APPENDIX

A. ELECTRONICS DEPARTMENTS

The following reports reflect on-site visits and interviews with department chairpersons and senior instructors. Each report was submitted to the departments for review.

COMPUTER/ELECTRONICS TECHNOLOGY
City College
William Carr

1. Programs

In addition to the core curriculum in Computer Electronics and Electronics Technology, City offers Computer Operations and Bio-Medical Electronics. Their program in Broadcasting is being revised to take advantage of a new facility. There is a special entry-level course in Cable Television which meets daily for four weeks. An upgrade program is being developed which accepts students who have completed 60 days of on-the-job training. City is requesting state funds to begin this two-year full curriculum program in Cable Television. Another two-year program is being added in Microprocessing.

2. Delivery Systems

Classes are offered both Friday evenings and Saturdays. The Cable T.V. program is short-term and intensive, meeting 5 days per week (late afternoons) for four weeks. However, there are problems with short term intensive courses. The college administration is not set up for courses that begin and end in mid-semester. There is difficulty in getting ticket numbers for the classes to register the students and the student can't get his/her grade until the regular semester ends.

3. Faculty

There are 9 fulltime and 12 parttime instructors. Carr reports that the faculty keeps current with the field. One owns his own computer store, while four others have their own computers. In addition, faculty associated with computer education participate in Digital Equipment Corporation's training programs, and are sent to DEC schools at no expense to the college.

4. Enrollment

	Enrollment	WSCH
	(Using figures of 1st of Census of F'81)	
Day	1047	5860
Evening	464	2382
Total	1511	8242

Overenrollment of classes from Census, Fall'81 using 1st Census:

	Total Classes	
Day	18	37
Evening	8	9
Total	26	46

During this spring semester, about 400 students day and evening were turned away.

5. Students

City has a high minority population. This international group of students includes 10 to 20 percent women. There are five students with disabilities in the program. Students are required to pass an English Placement exam and to have some background or knowledge of Algebra prior to entering the programs. Tutors are hired according to the language they speak. Students support a computer and electronics club which arranges for field trips and guest speakers.

6. Equipment

Since 1978, this department has been involved in a minicomputer training program with Digital Equipment Corporation who helped to design City's computer technology curriculum. Through VEA Funds (see VEA Allocation figures), they purchased DEC Equipment. Since that time, DEC has donated the following equipment:

(1)	Card Reader	est. value $ 1,000.00
(2)	LI436 Terminals	1,000.00
(1)	PDP11-40 Computer System (new value $100,000.00)	25,000.00

(8)	Video Terminals	10,000.00
(1)	Complete set of audio visuals for the CT 20 Logic Class	1,400.00
(2)	Complete sets of audio visuals in computer peripheral devices	7,000.00

A Line printer and a large disc drive valued at $75,000.00 have been received. DEC has continued to support the program at City.

VEA Allocation for Equipment

Computer Technology:	1979/80	$54,240.00
	1980/81	25,323.00
	1981/82	25,637.00

The department needs an additional $100,000 for computer equipment and $50,000 for electronic equipment. City also needs more lab and storage space.

7. Special Programs & Grants

City's Computer Electronics Technology department has been successful in obtaining VEA Grants for equipment so that their lab is in decent shape. This department has benefited greatly by having the DEC minicomputer program. Equipment is obtained at a 50 percent discount rate in addition to which DEC has donated valuable up-to-date equipment to the department. DEC's continuing support includes curriculum evaluation and development. DEC's regional representative spent a week at City with Bill Carr reviewing program weaknesses and strengths. Faculty are sent (at no cost) to DEC Service Schools. Four instructors attended seminars this summer. The Chair attended two such schools in Los Angeles, one in Chicago and one in Santa Clara. He estimated the dollar value of the training to be $5000.00. Because of their high minority populations (including women) they have been singled out as one of the more favorable minicomputer training schools and have received local, statewide, and regional recognition in the computer community.

City has an agreement for an interactive use of satellite communications with Portland College which will become active in 1986. This will be used for the cable television program and for microwave maintenance.

8. Remedial Programs

None.

9. Relations with Industry

Relations with industry are excellent, according to Carr.

10. Employment

Any person completing the program is able to get a job.

11. Coordination with Other Colleges

Pierce and City have similar courses and equipment.

12. Expansion and Improvements

There is a need for four more FTEs, additional equipment, and 2 more rooms, and a computer lab technician.

There is a need to expand the microprocessor offerings for which the curriculum is already developed.

13. Needs and Problems

This department is working to have a RSTS time sharing system which will allow them to put 18 students on one computer. (This have been installed for 8 students.) They want to interconnect all six computers.

They are still working to install all their equipment. They need a technician to maintain equipment and to run the lab in order to free the teacher's time to work with the students. Presently, they need funds to add classes. They have the students, but no equipment.

Teachers have as many as 60 to 70 students in classes designed for 45; math labs designed for 20 students have 40. 120 students are in the beginning evening computer technology classes. Because of competitive industry salaries, it is difficult to hire electronics teachers. They need funds to hire teachers. And they need additional lab space to house their equipment to provide student access.

14. Future Plans

The department would like to expand and improve its present offerings and add a microprocessor repair program.

15. Miscellaneous

16. Suggestions

17. Comments

City appears to have a vital program and the chair has demonstrated initiative in planning. This department has the sophistication to have arranged a co-operative venture with Portland College.

Advisory Committees

This department has an active advisory committee which considers matters of equipment and curriculum as well as the general condition of their programs. In addition to the department chair and instructors, the following are members of this committee:

Stan Schall - VEA Coordinator
Robin Rieken - Student Representative
Ron Brualdi - Product Test Mgr. Librascope
Jim Gayle - Manager, IBM
Lynn Grotz - Personnel, Data General
Winslow Guarmier - Sales Engineer, Tektronix
Gene Pioli - District Manager, Pertec
Raj Singh - Technical Operations, KTTV Supervisor
Ken Mouser - DEC, Santa Clara
Willie Hooks - DEC, Santa Monica

ELECTRONICS
East Los Angeles
Art Retig and Conrad Johnson

Introduction

The Electronics Department at East is a rapidly growing one with an actual increase in WSCH between Fall 1979 and 1980 of 24 percent, from 2103 to 2604. The projected WSCH for 1981 is 2829 and 4416 for 1984. The Electronics Department is one of high vitality with one of the fastest growing WSCHs in the occupational areas. In Spring '82 for the first time, they were required to cut back their evening schedule. Evening students can now only start in their major sequence during the fall semester.

1. Programs

The Electronics Department offers a two-year program that can be transferred to a four-year degree in Engineering Technology or can lead directly to employment. A Certificate of Completion in Electronics Technology or Electronics/Computer Technology is awarded to the student that maintains a "C" average and earns an A.S. while fulfilling the departmental requirements of about 40 units in Electronics.

2. Delivery Systems

The teaching methods are traditional.

Lecture - Laboratory - Movie - Video Tapes - Discussions

3. Faculty

The Electronics Department at East has two fulltime members (Arthur Retig* and Conrad Johnson) and 13 part-time members. Retig tries to get qualified high school teachers to teach the basic courses because they have developed teaching techniques, and they also bring some of their high school students with them both before and after graduation. (Under the Veysey Bill, high school students are allowed to take community college courses.) For the advanced courses, Retig finds that Engineers currently working in industry are needed because they bring current industrial trends and techniques to the classroom.

*In Spring '82, a long term sub-position was made available to the Electronics Department. They cannot handle the current student demand, nor meet anticipated growth with that position.

The full-time faculty at East keeps current in their field by:

1. Attending seminars in the summer.

2. Technical symposiums in the L. A. area.

3. Reviewing technical magazines, books, etc.

4. Working in the Industry during Summer Vacation.

4. Enrollment Spring '82

At the present time, there are approximately 1100 enrollments in Electronics courses at East (736-day; 379-evening). Many classes are overenrolled: Electronics 4A has 73 students while Electronics 10 has 63 students. The Chairman felt that they would soon have to start turning student away. (Students were turned away in Spring '82)

	ENROLLMENT	WSCH
Fall 1981	(Using first census figures - 1st week)	
Day	653	1959
Evening	556	1668
Total	1209	3627

	Total Classes
Day	18
Evening	14

Overenrolled classes at 1st census:

Day	10	classes were overenrolled
Evening	5	classes were overenrolled
Total	15	

5. Students

Day students at East in Electronics are fairly young, 19-20. Many are working; others are in need of a job but are not always able to find one. About 50 percent of these students are Hispanic, 20 percent Asian, 30 percent White, and 1 percent Black. The evening students are older and, generally speaking, better prepared. They are often working in the field already and are taking courses to upgrade their skills and get a promotion. Others are working full-time, but are interested in a career change.

6. Equipment

There is a need for more equipment at East, according to Retig. The existing equipment consists of two types; older equipment that needs to be replaced and newer equipment that has been received from VEA Grants through the Office of Instruction. The older, general test equipment at East is comprised of good, solid equipment. The equipment budget is about $5,000 yearly and, when available, there is about $3,900 for supplies. The new equipment the Department would like to have corresponds to its plans to expand in digital and communications electronics, and is as follows: general digital equipment, specific digital logic trainers, advanced digital equipment, PROM programmers (this machine has the capability of programming new chips or reprogramming old chips, E-PROMS), printers (the Department presently has none), communications equipment and solid-state microwave sources.

VEA ALLOCATIONS FOR EQUIPMENT

1979/80 Electronics	$47,685.00
1980/81 Electronics	00.00
1981/82 Electronics	19,605.00
	$67,290.00

7. Special Programs

All programs at East are special. They are designed for technical excellence. Their students are trained to analyze, predict, and measure the solutions to a wide variety of industrial problems.

8. Remedial

Students at the present time are not tested when they enter the Electronics program at East, but they are recycled if they have problems in the basic courses: Electronics 4, and Electronics 10. These students are sent to the Study Skills Center and for counseling, may take Math 30 and Electronics 2, Introduction to Electronics. Within the Department, a recycle option would allow the student to drop into a lower level electronics course.

9. Relations with Industry

Relations with industry are close, according to Retig. Both Retig and Johnson spend some summers working in industry, and thus stay current. Since Retig has been at East for sixteen years, many of his ex-students are now in the middle management of the electronics industry, such as Bell & Howell and Xerox. The Department's Advisory Committee is both friendly and helpful, meeting once a year and directing the school in purchases of equipment and development of its programs.

Advisory Committee suggestions helped the Department start its course offerings in micro-processors. Unfortunately, the Department has received very little equipment from industry. Although there are a few companies such as IBM* and Hewlett-Packard** that donate equipment, Retig believes most of the equipments offered by industry are typically worn out and high maintenance items. Some of the part-time faculty are currently employed in industry.

10. Placement

East Los Angeles College students have experienced a 100 percent success rate in finding jobs upon graduation. Their Department is regularly contacted by industry seeking to hire students.

11. Coordination with Other Colleges

The college has primarily an advisory relationship with other colleges. In addition, East has assisted, when possible, in the exchange of parts that are needed by sister colleges (e.g. West and Mission).

12. Expansion & Improvements

The Department needs to expand the digital and communications area of the program and strengthen the basic hand skills portion of the program, especially the ones that develop fabrication (hand) skills.*** In addition, they would like to add Laser and Fiber Optics and Satellite communication to their communication program. To meet the space needs of these expanded programs, Mr. Retig has a plan to place two or three temporary buildings together to increase lab and storage space.

13. Needs & Problems

The unmet needs of the Department fall into three areas: facilities, equipment, and staff.

Facilities - At present, the Department has two labs, a storeroom and a small office. Two new labs are needed. A lab for the proposed communications and digital courses; another as a fabrication lab which develops hand skills.

Equipment - It is necessary to replace the old equipment for basic courses and buy the new equipment for the proposed courses in digital and communication. Continued high usage is generating more maintenance, and calibration time.

Faculty - One additional full-time faculty member is needed.

*IBM Technical gifts program

**With a purchase

***Advisory Committee 1981

14. Future Plans

See Expansion & Improvements.

15. Miscellaneous

In order to avoid the cancellation of small advanced classes as would be found in the evening sections, the Electronics Department uses "Cluster Scheduling." With this approach, two or more basic classes feed one intermediate class and two intermediate classes will feed an advanced class. An additional bonus generated is that advanced classes are alternated and this system tends to limit uncontrolled growth as well as being able to predict the enrollment of the ongoing program.

An additional option is when an advanced course is offered during the evening program, it may be possible not to offer the same course during the day program. Using this system, they have not had an electronics class cancelled for low enrollment, day or night, for the past 10 years.

16. Comments

The program at East is a traditional, established, successful one, meeting the needs of the community it serves. Their success is demonstrated by the success of their graduates, employment of students after graduation, and the test of time. Their main concern is that they are currently not able to gather the needed resources to continue to maintain the high standards that are required in a high technology. Resources in the form of Budget allocations, as applied to Equipment and Supplies, facilities are needed to provide students the current skills that are being developed and applied in industry.

East Comments: I am sorry to report that in my opinion, and a review of the college budgets for the past 15 years will bear this out, Occupational Education has not been supported sufficiently. The community we serve wants their children to be able to get and hold jobs that can become careers, with first line companies. Historically, we have done our best but without the support of the district our efforts will be eroded.

ELECTRONICS
Harbor College
Frank Sonico
Kenneth Fiske

1. Program

The department offers both an A.S. Degree (2 years) and a Certificate (1 year-30 units --24 Major plus 3 Math and 3 Communications with the following majors:

(1) Electronic Engineer Technologist

(2) Electro-Mechanical Technician
(deals with equipment that is both electronic & mechanical such as computer printers and numerical control machines).

(3) Computer Technology (new program - hardware & software with emphasis on hardware)

(4) Solar Energy Technology (new program). (This program trains a technician, which includes the installer, to both install and troubleshoot solar equipment and systems).

2. Delivery Methods

The teaching method is the classic one of lecture/lab. However, the lab approach at Harbor is unique. The lab is an open one where the students, in addition to meeting their required obligations, can, and do, drop in and do their work whenever they want. Under this system, there is always one instructor on duty to direct the student's work and answer questions. Furthermore, this approach attempts to duplicate what the student will be doing in industry. Except for the first two semesters, the responsibility is put on the students' shoulders and they are given less structure in their lab assignments. Lab assignments are divided up into jobs like they would have in industry. The students are also expected to keep daily logs and write up their project progress reports like in industry. The students of this department are considered "working people" when they are hired by industry, according to Sonico.

3. Faculty

The faculty at Harbor consists of 4 full-time and one part-time instructors. There is not enough faculty at Harbor to be able to offer a full two year program in two years. Most students need 2½ to 3 years to finish an A.S. The faculty must rotate all but a couple of basic courses on an alternate semester basis and are therefore only able to offer the advanced courses every other semester. The faculty keeps current by going to trade shows and seminars and reading trade journals. Some of the part-time faculty that work in industry also help to keep the full-time people current.

4. Enrollment

	Enrollment (Using figures of 1st Census of F'81)	WSCH
Day	329	1584
Evening	111	525
Total	440	2109

Overenrollment of classes from Census, Fall '81, using 1st Census:

		Total Classes
Day	3	26
Evening	4	10
Total	7	36

The Electronics Department has a problem because their lab facilities are small and this doesn't allow them to expand their offerings. At present, the department doesn't turn away anyone but funnels them to the appropriate classes by extensive testing of beginning students.

5. Students

Day--The average age is between 18 and 20. After the first or second semester, most of these students work part-time. Many of these students are on EOP&S or other grants. About 50 percent of the students are Hispanic. Now there is a new student group of Vietnamese, approximately 5-10 percent.

Evening--These students are in their early 30's and 95 percent of them work. The retention rate is 40-50 percent in the first semester and gradually increases until in advanced courses it is 85-100 percent.

The department has many workouts (students drop out in order to work) either because students are forced to work or because they want to save money to go to college. Many workouts change from the day to the evening program.

6. Equipment

Fifty percent of the present equipment is 12 to 13 years old and needs replacement. Much of the equipment is not current and often is beyond repair after many years of constant use. There is a need to continuously budget equipment in order to replace equipment as it is needed, and to buy equipment for the new programs in Solar Energy Technology and Computer Technology.

The department usually gets some equipment from industry but they don't

have enough space to accept it. The equipment is usually old and can only be used for specialized purposes. Recently, the department got a large computer system from Hughes, which is useful for advanced computer technology courses but it only meets part of the department's need. The department needs elementary items such as meters, generators, and oscilloscopes for basic lab stations. Much of the present equipment is almost dead. There is a need to replace this and a need for some additional equipment.

In connection with current equipment, there is a need for some higher level staff to service it because of its sophistication.

VEA Allocations for Equipment

Electronics Department:	1979/80	$26,828.00
	1980/81	19,794.00
	1981/82	4,263.00
		$50,885.00

7. Special Programs

8. Remedial Programs

There is a need for better preparation in English and Math for most of the students. During the first week, the department conducts a series of tests with the purpose of placing the students and not excluding them. The five tests are:

(1) A departmental Algebra test which has no word problems.

(2) The Raven Matrices Test to determine the ability to reason.

(3) The SCAT Math Test which tests the ability to handle basic high school math.

(4) Gates Reading Test.

(5) Gilford Zimmerman Temperment.

Students exhibit a positive change in attitude after a minimum of 2 semesters in the program. Part of this change is attributed to proper placement.

The department has no remedial facilities or programs. The above tests are used to direct the students to the proper level. For instance, if they score over 29 percent on the SCAT Math Test, they are put in the regular program; between 10 percent and 20 percent they are put in Electronics 20 (Electronics Circuits I) which covers the basic electronic

circuits and the math used with these concepts; below 10 percent the student is put into remedial classes such as ET 48 (Engineering Technology) which covers arithmetic. This last class is the only remedial class taught by the department which covers math for electronics. Communication and reading skill deficiencies are channeled to the appropriate division.

9. Relations with Industry

The department's relations with industry are fine; all the regular faculty consult. There are possibilities for on-site classes in the future. There are four Advisory Committees--one for each major. The committees include technicians at a responsible level, engineers and management. They meet every 18 months to 2 years and give advice in the following:

(1) What's happening in the field--new trends.

(2) The department, lab, equipment and programs.

10. Employment

According to Sonico and Fiske, every student that wants a job can have one. Many of their graduates eventually go into management and become foremen and supervisors. After 22 years, many of their former students are in good positions and recruit students from Harbor. The department gets calls daily from industry in need of technicians. Each year there is a Job Fair at Harbor where industry recruits on campus. Fiske and Sonico allow the companies to talk only to the advanced students that are near graduation and not the beginning students. According to them, many companies often hire the beginning students only to get rid of them after their particular projects are over in 12 to 18 months.

11. Coordinations with Other Colleges

There is no coordination at present.

12. Expansion & Improvements

The greatest need of this department is more lab space, because of the unique lab setup where there is an open lab and students can come in when they want. Under this system, there is one instructor on duty at all times.

The areas that need expansion are Electro-Mechanical, Computer Technology and the Solar Program.

13. Needs & Problems

A special problem is the high ADA that the department is expected to

meet. At present, this is 425 to 450. According to Sonico & Fiske, because of the highly technical nature of subject matter it is difficult to meet this ADA. In a typical day, the average instructor will have to teach 5 or 6 different subjects at all levels.

There is a need for facilities, equipment and faculty.

14. Future Plans

The department would like to develop the existing programs and implement the two new programs, Computer Technology and Solar Energy.

15. Miscellaneous

Technology has expanded to such an extent that it takes three years to teach the required background in electronics.

ELECTRONICS

Mission College
Charles Cook

Introduction

The electronics program at Mission is a new program just started this past fall. It currently offers the first year of a basic electronics technician program and as soon as funds allow, it will be expanded into a two-year program. This program is expected to act as a "focus" for aircraft electronics which will receive the spinoff from the general electronics program.

1. Programs

This is a new program that currently offers only the first year of a basic electronics technician program. At present the college has not received permission to offer a certificate program. When the program is expanded to a full two-year program, there will be two options:

1. Computer Technician

2. Microwave Technician

Cook, who taught in the Electronics Department at East, has developed the following philosophy for the new program: to provide the student with a broad general knowledge in electronics. Cook stressed that he believes such a program should not go into specific systems such as IBM or Control Data, but should study the components that make up all systems.

The specialization should be left to the industry once the student has finished the general program at the college, otherwise the possibilities for the technician are narrowed.

Electronics Departments should not be too closely linked to employers because this will limit their knowledge. If technicians are broadly trained, they are not limited and their base is translatable, giving them the opportunity for upward mobility.

2. Delivery Systems

The teaching method used is the classic one for electronics consisting of a lecture-lab set up. Due to lack of funds, there is no audio-visual material. This would be very useful in teaching electron flow.

Cook is also planning a short-term course to keep students in school; these courses would be at a lower level than the regular course.

Otherwise, Cook is against the short module (shorter than a quarter) because he believes it destroys student continuity and he does not believe modules to be the optimum approach.

3. Faculty

There is only one FTE at Mission, Charles Cook. Cook used to teach electronics at East and for the last five years he has been teaching the hard sciences at East. Now he is developing Mission's program in general electronics.

According to Cook, there is a need for one FTE and a lab technician. Cook keeps current by keeping up with literature, going to seminars and having informal conferences with industry people.

4. Enrollment

Classes, according to Cook are overenrolled by 10 percent to 20 percent. He does not turn away students but feels that shortly there will not be enough sections due to inadequate space and staff.

	Enrollment	WSCH
	(using 1st census of F'81)	
Day	-0-	-0-
Evening	78	234.0
Total	78	234.0

Overenrollment from 1st census:

Day	-0-
Evening	-0-

Total Classes	
Day	0
Evening	3
	3

5. Students

The majority of the students are age 20-35, and are employed. They are pretty well evenly divided racially following general population distributions, i.e., 20 percent Hispanic, 20 percent Black, and 40 percent White. They are taking the courses to either upgrade existing skills or to obtain sufficient skills to get an entry level job.

The retention rate is about 50 percent in the initial first semester courses and appears to be about 75 percent (an estimate at this point) for the second semester.

6. Equipment

The department has no equipment money this year, although it has $6000 for supplies. It is presently borrowing about 50 percent of its equipment from Avionics and during the Spring semester, this will go up 90 percent.

The equipment for the first year is, according to Cook, minimal--barely adequate and for the proposed second year courses, it would be very inadequate. There is presently no computer-related equipment and no digital equipment. There is a need for $30,000 to $50,000 for equipment for the second year courses.

At present, the department doesn't receive any equipment from VEA, because VEA has the restriction that a school must have a full accepted 2-year program before it will grant money for equipment.

Cook has been notified that some industries are willing to donate some equipment. Cook is afraid it may be too specific and not broad-based enough for general usage which will fit into the general nature of the school program in electronics. The following are some of the needs in equipment:

1. Computer Equipment
2. Communications Equipment
   a. Microwave
   b. Small transmitters & receiver modules
   c. Satellite receiving equipment

VEA Allocations for Equipment

1979/80	Electronics	$ 00.00
1980-81	"	00.00
1981/82	"	00.00

7. Special Programs

8. Remedial Programs

Cook finds that his students need more preparation in math and English. At present, there is no testing of entering students. Students now drop out because they can't handle basic math, What is planned is a program that was used at East Los Angeles College. Under this system, if a student is failing math for electronics, then he drops into arithmetic for electronics, Basic English and a survey of Electronics. After one semester, the students go back into basic Math for Electronics and Basic Electronics.

According to Cook, the secret of doing well in electronics is knowing how to study electronics. This requires a mastery of a new language--the terminology of electronics--by learning the precise definitions of terms. Secondly, a knowledge of mathematics is necessary. At East Los Angeles College, there was a study by the Veterans Administration where two groups were studied. One group took the basic courses while the other had special study with courses in basic math and "how to study." In the first group 0 percent were retained for 2 semesters, while 60 percent of the second group were still in school after 2 semesters and were sucessful in course work attempted.

9. Relations with Industry

Relations so far are limited because the program is just getting started. The Advisory Committee is in the formative stage.

However, the school has been approached by several companies looking for students with minimal electronics background. General Telephone accepts students with only one semester of D.C. electronics as "communication technicians."

10. Employment

So far, there has been very little hiring. A few of the current students have taken exams at General Telephone and have passed them and are eligible for promotion.

11. Coordination with Other Colleges

There is close coordination with East Los Angeles. The Mission electronics program is using East as a model because of Cook's experience and because of East's effectiveness.

12. Expansion & Improvements

What is needed is to expand the present one-year program into a full two-year one and get approval from the state so they will be able to get VEA Funds.

Expansion is imminent if the college provides the funds for some of the following:

1. Another staff member is needed to add the second year.

2. Additional equipment is needed, especially for the second year.

3. Additional facilities are needed most of all. At present, there is one lecture room and one lab and no storage area or repair shop. The one class and only one lab limits the program to one class per evening. The college is building new facilities, but it includes only one classroom and one lab and therefore they will be limited to one class per evening.

Cook also wants to see Mission develop strong communication with the electronics industry personnel to determine the direction of industry and therefore the needs of the student. The colleges and businesses should work closer together, but colleges should not limit the scope of their programs by tailoring them too closely to one company's needs.

13. Needs & Problems

14. Future Plans

Cook would like to see two areas developed in the future. First, microprocessors which are a part of many new computers: automotive, personal, amd numerical control. He is especially interested in developing the microprogramming for microprocessors for special uses. This applies to hardware and involves programming the microprocessor's chips by a Prom programmer or an E-Prom programmer. Secondly, Cook wants to develop microwave communications such as satellite communication and point-to-point communications which includes telephone and cable transmitters.

AIRCRAFT ELECTRONICS
Mission College
Richard Martin

Introduction

The Aircraft Electronics Technology Program is one of only two such programs in Southern California-the other is offered at West through the Airport Center.

This is a new program (2 years old) at Mission and needs more publicity so that its existence is made known. So far, the enrollment is very low and it is considered a low vitality program.

Mission is also implementing the Electronics Program which they think will serve as a focus with a spinoff to the Aircraft Electronics Program. In order to justify the high cost involved in the aircraft electronics program, the college will make an effort to recruit more students.

1. Programs

The college offers both an Associate of Science Degree and a Certificate in Aircraft Electronics Technology; the Associate Degree takes four semesters while the Certificate takes only one year. The program is basically the same as the Airport Center's. Aircraft Electronics deals with transmitters and receivers, microwave equipment such as radar and navigation equipment.

The beginning courses have students with no previous training. In these courses, the emphasis is on math, use of the calculator and basic electronics. The second year program is more specialized and goes deeper into specific aviation applications.

2. Delivery Systems

The teaching methods are primarily the lecture/lab approach with much hands-on experience. The program is divided up into 3 modules of six weeks (class time is 20 hours per week). This system, according to Martin, has had only minor problems with registration. Both lecture and lab are contained within the single course description, and thus lend flexibility to the instructor's scheduling of its presentation within the six weeks block.

3. Faculty

By reading of new developments in avionics in aviation publications, Martin stays current.

4. Enrollment

This one class meets 20 hours per week.

This semester's class has eight students, continuing from F-81 plus a returnee and another student who entered with outside experience.

	Enrollment	Census WSCH
	(Using 1st Census Figures - F '81)	
Day	10	200
Evening	0	0
Total	10	200

Overenrolled classes at 1st Census:

Day	0	classes overenrolled
Evening	0	classes overenrolled
Total	0	

Total Classes:

Day	1
Evening	0
Total	1

5. Students

All the students are from the Valley and some of them are Spanish speaking.

The students vary in age; from 21 to 55 years old. There are six Hispanics, one Black, two Armenians, and one Caucasian, but no women are presently enrolled.

Half of these students work.

6. Equipment

The equipment situation at the present is good, but equipment will be needed in the future, especially for the digital courses. The original funding was from VEA and they bought adequate numbers of lab test equipment and one-of-a-kind equipment to demonstrate principles.

Aviation Electronics uses the same space as General Electronics and it shares about 50 percent of its equipment with Electronics. There is a need for trainers for the 3rd and 4th semesters - receivers, transmitters, digital and microprocessors.

VEA Allocations for Equipment

1979/80	Aircraft Electronics	$26,430
1980/81	" "	0
1981/82	" "	0

All funding is now within the Mission College budget.

7. Special Programs & Grants

8. Remedial Programs

Martin says that some of the students need more training in English and Math. At present there is no entry testing, but he believes there should be.

All the remedial programs and facilities are located at the Learning Resource Center.

9. Relations with Industry

So far industry has been of very little help in regard to equipment. Sperry has donated a couple of field trips and connectors have been donated by Richie Electronics from Sunland.

No equipment has been bought from government surplus. Martin believes that on-site training is not viable for his department. There is no demand for contract education because the major manufacturers have training seminars themselves.

ADVISORY COMMITTEE MEMBERS

John Daniels	Lockheed, California
Eric Lindgren	Lockheed, California
Christian Cadoret	Beachcraft West
Randy Brandy	Sperry Flight Systems
Enrique Gonzalez	Trade Tech College
Ted Gustin	Whiteman Airport
Clyde Titus	Student
Robert Walker	Tiger Air
Raymond Peel	North Valley Occupational Center

This committee, which has been in existence for 2 years, is currently being updated. It will meet once a year.

The committee does the following things:

> Informs the college on what skills the students need; the kinds of equipment that should be used; directs the college as to what classes should be taught and their content; reviews new courses; informs the college about jobs, salaries and promotional opportunities; helps the college identify resources and companies that might donate equipment; and helps the college place its students.

10. Employment

The department so far has had a good record of placement, which is done mostly through personal contacts. There are plenty of jobs available, many more than advertised, according to Martin.

11. Coordination with Other Colleges

At present, there is close cooperation with the Airport Center where Martin used to teach. Martin also plans to set up communication lines with the Industrial Studies Department at Cal State, Los Angeles, which conducts a baccalaureate level course in Aviation Management.

12. Expansion & Improvements

The primary way to improve the program is to have more publicity to recruit more students. At present, the main problem is the small number of students.

He believes that the Avionics Department should be moved to a local airport. The publicity should stress the fact that Mission has a specialty in Avionics instead of just a few courses.

Martin believes that since microprocessors are so cheap now and can be used for many things, that his department should expand its offerings in the digital and microprocessor area.

13. Needs & Problems

The special need is to have a facility that has high visibility to the aviation community, such as one at Van Nuys Airport. Location is important for this program and at present the facilities are virtually hidden. Currently, a new facility is being built at the northwest corner of San Fernando Road and Kalisher in San Fernando, which will more closely identify the program with Mission College.

14. Future Plans

Since this program is only two years, the main problem is to get the basic program going and recruit more students for it. A beginning class of 35 in AET 1 (Calculator Math) would probably be sufficient to sustain the succeeding classes.

15. Miscellaneous

Martin takes an active role in the recruitment of students by taking part in the "Salute to Education" at Northridge Plaza and by visiting the high schools, as well as aviation oriented events as his time permits.

ELECTRONICS
Pierce College
William Shaw

Introduction

This department was at one time ranked as the best electronics department in the country. Presently, it has a high rate of enrollment growth and is considered to have a high vitality program. The electronics department sends more students than any other department at Pierce to four-year colleges: 60 per cent of fourth semester students go on and receive a BSET at some of the following institutions:

Cal Poly Pomona
Cal Poly San Luis Obispo
Utah State
Arizona State
Longe Beach State
De Vry Institute of Technology (Phoenix)

1. Program

The department offers both a Certificate and a A.S. Degree. The Certificate Programs with options in various electronics fields (Consumer, Bionics, Numerical Control, Communications and Digital) provide salable skills at the end of one year and jobs at local companies such as Sears and Litton Data Systems.

The certificate programs according to Shaw, require a higher level of math skills initially than the A.S. Degree because AC & DC Electronics are taught together in one course in only one semester.

The A.S. Degree is offered with 2 options: Engineering and Radio and Television. The engineering option will provide the student with a broad electronics background required for employment in all sectors of industry as an electronics engineering technician. This option can also lead to a B.S. in Electronics Technology or Industrial Technology at some branches of the California State University system.

The Radio and Television option has been designed by representatives of the local electronics industry and it prepares students for employment as an electronics technician to work on consumer products.

2. Delivery System

Most classes are taught in the classic format for electronics, lecture and lab.

In some classes a video tape tutorial is set up in order to review equipment use.

In the Introductory Course, Shaw presents a musical program which shows the applications of different types of recording and sound equipment.

3. Faculty

There are five FTE's at Pierce and thirteen part-time instructors. Most of the part-time people work in industry and thus are able to remain current.

The permanent faculty stay reasonably current by maintaining contacts with industry, working during the summer in industry, following the literature and attending seminars.

4. Enrollment

Enrollment in electronics:

	Enrollment (using 1st Census Figures - F'81)	Census WSCH
Day	842	2866.0
Evening	970	3081.0
Total	1812	5947.0

Overenrollment in classes at 1st Census:

			Total Classes
Day	3 classes	Day	29
Evening	6 classes	Evening	23
Total	9 classes		52

Classes in electronics are overenrolled. The entry-level classes are opened up to as many as 100 students. These classes could be broken down into smaller sections if there were more instructors available. This would be advisable because at present students drop out, according to Shaw, because of the crowded conditions. The worse situation is in the lab sections where fifty students work in an area designed for 20 to 25 students. In the beginning classes about 50 per cent of students are workouts or dropouts.

Although the department turns away no one due to its open-class policy, it does lose many students because of the crowded conditions.

5. Students

Day - The average student in the day program is about 18 to 19 years old.

Ethnically the students are in the same proportions as they appear in the community:

> The department loses about 50 per cent of its students every semester the first year. The second year the rate goes down to 25 per cent. About 20 per cent of the day students work.

Evening - The average evening student is about 27 years old and 80 per cent of them work.

6. Equipment

The present equipment, according to Shaw, is not bad. Most of their equipment has been received through VEA Grants.

Most of the equipment offered by industry is simply too old and industry is trying to unload it.

The important thing in having a good department, according to Shaw, is equipment that is current with what is being used in industry. What his department specifically needs now is specialty equipment, such as microwave equipment and current test equipment.

VEA Allocation for Equipment

1979-80	Electronics	$ 3,313
1980-81	Electronics	43,177
1981-82	Electronics	15,245

7. Special Programs and Grants

8. Remedial

The students, according to Shaw, do need more preparation in English and math. At present there is no testing of students but there was in the past in math. The department itself has no remedial programs but sends the problem students to the Learning Skills Center on campus.

9. Relations with Industry

Relations with industry in the West Valley are good.

Many of the faculty consult with industry; and there was a course

Fundamentals of Electronics, taught at Powertec as part of the outreach program every semester.

The members of the Advisory Committee are all from local industry and meet once a year to advise the department on the Certificate and on the A. S. Programs.

10. Employment

There is a big need for qualified technicians in local industry and, consequently, the placement rate is almost 100%. Students are working before they finish and they often get jobs through Advisory Committee contacts.

Most fourth semester students are already working or committed to jobs.

11. Expansion and Improvement

The department needs more modern computer teaching devices. Because the beginning classes have been opened to enrollments of up to a hundred students, a larger lecture hall is needed.

The communications option needs expansion in such areas as fiber optics and lasers.

What is needed at the present time is one course to expose the student to this area and not a whole program.

To set this course up would require additional faculty and more equipment which is relatively expensive.

The department as a whole needs two more FTE's in order to take care of the large enrollments and carry out the expansions.

12. Needs and Problems

The most crucial problems are lack of adequate staff and a suitable lecture area.

13. Miscellaneous

ELECTRONICS AND COMPUTER ELECTRONICS DEPARTMENT
Southwest College
Hari Panjabi
Cecil Reed
Tom Baldwin

1. Programs

Programs are primarily entry level. Since the beginning, electronics course is taught only once a year instead of each semester; they do not have sufficient numbers of students to continue to intermediate or advance classes. In addition, they do not have equipment or lab space. They would like to include some advanced and intermediate classes in communications such as Detail Circuit Analysis and different types of transmission.

The program is a general one with emphasis placed on digital and microcomputers.

2. Delivery Systems

The teaching method is lecture with demonstration, plus lab experiments and projects.

3. Faculty

The Electronics Department has only one permanent full-time faculty member who has just returned from a sabbatical leave.

Classes are taught by part-time and hourly instructors. There are four part-time instructors.

The faculty keeps current by taking courses and seminars in industry and other schools.

4. Enrollment

	Enrollment	WSCH
	(Using figures of 1st Census F'81)	
Day	136	519.0
Evening	103	398.0
Total Enrollment	239	918.0

Overenrollment of classes from Census, Fall 1981 using 1st Census:

Day	1
Evening	1
Total Enrollment	2
Total Classes:	
Day	5
Evening	3
Total	8

Labs are extremely small with only 24 stations and consequently are usually overcrowded.

5. Students

Many of the students are employed. Most night students work full-time during the day; day students work swing or night shifts. Many students are enrolled to upgrade skills. Parallel courses are needed in day and evening since many students have a change of workshift during the semester and are forced to drop the class.

95 percent of the students are Black. 70 to 80 percent are studying beginning electronics.

6. Equipment

Much equipment necessary for electronics courses was stolen and has yet to be replaced. Students have dropped classes because equipment is not available (25 students have dropped from the Saturday class). Instructors report that it takes years to get equipment repaired. Equipment wears out rapidly when used in entry level classes. They have ordered a demonstration trainer for Microwave. They would like to secure Digital Trainers ($160.00 ea.) to teach courses on servicing microprocessors where there is a big demand for technicians.

They have a small electronics lab which accommodates only 18 to 20 students which they must share with the machine shop. That means they have access only half-time. The Digital lab accommodates only 15 to 16 students. This lab is shared by four programs: Measurement Science, Quality Control, Engineering, and Electronics. A building is available for lab and requires only a power supply and some work benches.

Storage space is a problem. A storage room was broken into (in one of the labs) resulting in the loss of equipment and the subsequent need to install a special door and locks, which will cost over $800.00. They need a separate electronics lab so they can rotate classes.

VEA Allocations for Equipment

Electronics Department:	1979/80	$22,820.00
	1980/81	17,461.00
	1981/82	11,070.00

The department has received some items of equipment to replace stolen items.

7. Special Programs & Grants

For the last seven years, VEA has provided the funds for equipment, but they do not provide funds if equipment is stolen. The District needs a reserve fund to take care of emergency situations such as this, according to Reed.

8. Remedial Programs

The existing remedial programs should be adequate, according to Reed.

Tutoring is also available on campus.

No testing is presently done. Students are lacking in math skills.

There are three VEA tutors that are selected from the Advanced Students. Panjabi also tutors his students.

9. Advisory Committees/Relations with Industry

Advisory committees, made up of industry, play an essential role in recommending funding to VEA. They even influence how courses are listed. VEA wants to fund end object programs (those that lead to jobs), not ones that transfer. Industry wants new programs in communication (radio & television).

10. Employment (Placement)

There is an employment center on campus. The department also has contact with employers. Student employment has been nearly 100 percent. Students are placed at Hughes, Xerox and Sperry Flight Systems.

11. Coordination with Other Colleges

ELECTRONICS
Los Angeles Trade-Technical College
Victor F. Veley, Coordinator

1. Programs

The Electronics Department offers four majors:

a) Electronics Engineering Technician

Communications, digital, microwave. Employment in Research and Development aerospace companies such as TRW, Hughes.

b) Consumer Electronics

Video techniques and television service. Employment in Sears, RCA, Motorola.

c) Computer Maintenance Technician

Digital techniques microprocessors and microcomputers. Employment in I.B.M., Xerox.

d) Radio Communications

AM-FM, Single Sideband Microwave, and Television Links. Employment with Southern California Edison, City and County Communications, R.T.D.

It is possible to get an A.S. Degree in any of the above programs. Also available is a Certificate of Completion if students complete 48 units in one of the four majors. Course content includes the following: DC, AC. Solid State, Digital Circuitry, Microprocessors, Communications, Microwave, Lasers, Video Techniques, and Opto-Electronics.

2. Delivery Systems

There are non-traditional courses presently in existence at Trade-Tech. The training methods involve lecture/lab and visual demonstration. There is an effort now to develop parts of the programs during the afternoon so facilities will be utilized from morning to night. In the Spring 1982 Semester there are two classes in the afternoon program and a third will be added in the Fall.

3. Faculty

According to Veley, there is sufficient faculty in the needed areas. The part-time are all from industry and they have no problem keeping

up-to-date with the current "State-of-the-Art".

There are eighteen (18) full-time faculty and seven (7) part-time in the Electronics Department. The full-time faculty keep current through advice and information from Advisory Committees. They also attend relevant seminars during the summer recess.

4. Enrollment

Fall 1981, using 1st census:

	Enrollment	WSCH
Day	1,618	10,790
Evening	417	2,070
Total (4th Week Census)	2,035	12,860

Overenrolled Classes, using 1st census:

Day	20
Evening	7
Total	27

Total Classes:

Day	55
Evening	13
Total	68

5. Students

The day students average about 28 in age and are studying for a career. The evening students are older and are primarily interested in upgrading themselves. There is about 20 percent attrition rate per semester. See attached Exhibit C.

6. Equipment

The department receives very little equipment from industry; most of it comes from VEA Funding Sub-part-2.

About 80 percent of the equipment is 5 to 10 years old which makes it obsolete. There are shortages in equipment in the latest technologies such as microcomputers, and shortages of modern oscilloscopes.

The following equipment has been replaced: Eico non-triggered oscilloscopes, high voltage power supplies, outmoded generators and meters. (Trade-Tech gets $300,000 a year from various sections of VEA and efforts are planned to increase this amount.)

VEA Allocations for Equipment:

Electronics Department	1979/80	$52,000
	1980/81	$32,000
	1981/82	$58,000

7. Special Programs & Grants

In 1982 a grant proposal involving High Technology is being submitted for Federal Funding under Title III.

8. Remedial Programs

The students at Trade-Tech in electronics need more preparation in math and English. There is an Assessment Test for all entering students and those that score below a certain level take the Assistant Program, consisting of an introduction to electronics, math and related classes. This program is 12 units and takes one semester. After completing this, they can start on the regular electronics curriculum.

Three VEA Instructors (Mr. Ruffeld, Mr. Malhotra, and Ms. Williams) visit these first semester students and assist them in Math and English tutoring. Additional training facilities are available in the Learning Resources Center; tutors are provided by E.O.P.S. program.

Assistant Program

The students are given tests in math and basic English by the Counseling Department, and those students that might have problems in the regular program are sent to the Assistant Program.

Although the program has a high attrition rate, 70 to 75 percent of those that finish go on to the first semester electronics program, and are usually in the middle of their class as far as performance.

This program, which runs 24 hours a week, emphasizes four main areas:

1. English - this is the student's biggest problem.
2. Math - use word problems to help improve English.
3. Electronics - students get a preview or overview of basic electronics theory including DC, AC, Color Code, Schematic Symbols, Nomenclature.
4. Lab - students are taught manual skills (visualization & use of equipment).

9. Relations with Industry

The electronics department has very close relations with industry, although there have been few equipment donations from this source. Most of the department's equipment comes from VEA Funding. At present there are neither on-site classes nor contract education.

In the past, CETA classes have been 90 percent successful. The department had also trained RTD employees on microprocessors on-site under contract.

The Electronics Department has four Advisory Committees which meet once a year and are very useful on advising the department on the needs of industry.

10. Employment

One hundred percent of these students seeking employment are able to find jobs. Placement has been validated by Los Angeles Trade-Technical College's Research Department. Ten to fifteen percent of graduates transfer to the four-year institutions.

11. Coordination with Other Colleges

At present, there is no coordination with other colleges. Articulation Agreements are being sought with California Poly Pomona, California State Los Angeles, and California State Long Beach.

12. Expansion

The area that most deserves expansion is Electronics Engineering Technician. The primary way to improve the programs now in existence is with the addition of new equipment. This is especially needed for the Computer Maintenance Technician program for which at present, there is no computer on campus for student training.

The department could develop interdisciplinary courses in digital techniques with the Automotive Technology Department (electronic ignition systems) and the Metals Department (numerical control).

13. Needs & Problems

Much of the department's equipment is more than ten years old and must be replaced. In addition, there are virtually no funds available for equipment maintenance and repair.

14. Future Plans

Veley would like to develop the Electronics Engineering Technician

program to the High Technology level. This would include the expansion of programs related to Lasers, Opto-Electronics and Microprocessors.

15. Miscellaneous

Mr. Veley believes that the way to meet the training needs in electronics is by expanding the existing programs on the campuses and by adding new positions. He is of the opinion that more of the unemployed and minorities can be trained for high technology. This is the goal of the proposal for Federal Funding under Title III.

ELECTRONICS
Valley College
Chester Jur
Joseph Labok

1. Program

The Electronics/Physics Department offers occupational certificates in the following programs:

- Biomedical Equipment Technology (BMET)
- Consumer Electronics Servicing (TV Servicing)
- Electronics Technology (Digital Circuits & Microprocessing)

The certificate requires one year for completion. If a student goes on to complete the General Education Requirements and additional courses to reach the 60-unit maximum, then he/she can receive an AA or AS degree.

The Consumer Electronic Servicing program is strong in the TV area and there are plans to expand the Video Tape Recorder (VTR) and Stereo Equipment Servicing.

Biomedical Equipment Technology does stand alone as a separate program. It trains a technician who services, calibrates and repairs patient equipment such as that found in intensive care areas and clinical lab areas of hospitals. This program, started in 1972, is the only full-time BMET program in the area and probably in the the state.

These programs train developing technicians and not engineers. Because of the lower math level in these programs, there is in general a transfer problem: Technology courses are not acceptable at Northridge and UCLA towards Electrical Engineering. They are, however, acceptable at Cal Poly and acceptable as electives towards other Baccalaureate programs in many other CSU colleges.

2. Teaching Methods

The teaching methods are the traditional for electronics: lecture and lab, with equal time spent in lecture and in lab.

3. Faculty

There are 2 FTEs and 1 hourly-rate faculty. There is a need for more FTEs so that they can offer a more advanced class during the day. Some students work at night and consequently can't take the night courses for the AS. Consequently, they are forced to go elsewhere to take the needed courses.

The full-time faculty stays current by the following means: Labok works at Hughes during the summer, while Jur has been going for 11 years to the

East to week-long courses through EIA (Electronics Industry Association). EIA pays the cost for the trip. Jur himself has written a course on the repair and maintenance of video tape recorders and teaches a seminar for high school teachers.

The part-time faculty works in industry as engineers or the equivalent. Some are in training areas in companies and are good at telling the college what industry needs are.

4. Enrollment

	Enrollment (using figures of 1st census F'81)	WSCH
Day	316	948.0
Evening	724	2370.0
Total	1040	3318.0

Overenrollment according to 1st census:		Total Classes	
Day	2	Day	10
Evening	6	Evening	18
	8		28

The beginning classes are overenrolled; some classes start with over a hundred. Overcrowded labs are a problem: labs that are planned for 36 students often have 50 students. Because of the crowded conditions many of the students drop and sometimes these are the best students. (Limits in classes - these are set by Department Chair and they indicate the number of students that can be handled plus a number that will usually drop--20%).

So far the department doesn't turn away students, but this semester they will take no more than 20% over the limit. At present they are not able to have enough sections because there is not enough budget.

5. Students

Day Students

The beginning students are about 20-21 years old. Some of them work part-time while the intermediate students are about 24-25 years old. Many students work full-time, usually on the 3 p.m. to 11 p.m. shift. About 30 percent are non-caucasian and 5 percent are female.

Evening Students

These students are usually older and most of them work full-time. About

40 percent are caucasian. Some already work in electronics while others are in non-technical areas. There are some who come back in the evening classes for upgrading while others plan to enter the field and take introductory courses. The retention rate is about 70 percent.

6. Equipment

The department has equipment for courses but it is short in numbers of items so that some equipment must be shared in laboratory. There is a need for more of certain kinds of equipment such as digital equipment and oscilloscopes. Some of the equipment such as the curve tracer is obsolete due to changes in industry. At present, the department doesn't have the equipment to measure certain circuit parameters.

Equipment that comes from industry and government surplus (community colleges have low priority) is generally obsolete. Otherwise, most of the equipment the department has received has come from VEA funds. More basic test equipment is needed, especially high performances oscilloscopes. Also needed are some microcomputers and their test equipment.

VEA Allocations for Equipment

1979/80	Electronics	$29,762
1980/81	"	34,021
1981/82	"	24,750

7. Special Programs and Grants

8. Remedial Programs

Their students need more preparation in English and math. At present, there is no entrance testing of students but the department used to test them. At present, there are no special remedial programs. Students are referred to the Study Skills Center for tutoring. The department selects these VEA tutors from their own students.

9. Relations With Industry

The department has close contct with industry; they also maintain contact with members of their Advisory Committee and others in Industry. In addition, many students that finished at Valley College are working in industry and come back and ask for other students to hire.

There are two Advisory Committees: one for Biomedical Equipment Technology and another for Electronics Technology, including Consumer Equipment Servic ing. Both meet once a year. At present the department teaches a course in Introductory Electronics at the ITT Gilfill in Van Nuys. The course is open to the public.

Both of the FTEs (Labok and Jur) consult in industry but there is no on-site or contract education. Industry usually tells the department to concentrate on the basics and they will take care of the applications, but they really want some of the applications too.

10. Employment

The question is hard to answer because hiring takes place away from the college and Labok is not aware of all students working. They do know some students are placed and they have placed some personally. Most that finish the certificate or A.S. get placed. Labok is able to keep track of the BMETs; thirty to forty graduates are employed in area hospitals and contract service organizations. When COOP Education was supervised by the department frequent contact was made with the employers of these students. This was lost when COOP Education was set up as a separate activity.

11. Coordination

At present there is no coordination besides the planning of the summer courses offered. Labok sees the need for closer coordination in planning programs.

12. Expansion and Improvements

There is a need for one more FTE so that advanced courses and a complete program may be offered during the day. More equipment is also needed in addition to another lab.

Labok wants to expand his offerings in video and audio consumer electronics and also in microcomputer and microprocessors. Jur stated that Automotive Electronics is another area that needs trained technicians.

13. Needs and Problems

See Number 12.

14. Future Plans

What is needed, according to Labok, is to improve quality, content and viability of existing programs and to keep them updated and geared to industry's needs. At present, the colleges are very behind industry. The staff also needs to be updated.

Labok wants to add other technological areas as they blossom, such as digital and microprocessors and automotive electronics. In addition he would like to see the addition of communications, such as satellite communications and digital communications (from computer to computer) and electro-optics technology with laser applications, which is a combination of physics and electronics, and at present is used at companies

such as Hughes and Lockheed.

15. Miscellaneous

Programs in nuclear medicine technician and X-ray servicing technician are not viable at this college. In these technicians need state certification so are usually trained by people that manufacture the equipment. In addition, the equipment is extremely expensive. The college can only provide the basic for the fields. UCLA had a 2-year program for X-ray technicians.

16. Suggestions

The department is faced with students that need remedial preparation, especially students from foreign countries. Labok would recommend ESL courses and Math 31 be taken before students start electronics courses.

The colleges prepare the student for employment as an entry-level technician, such as a test technician, for example. The company then develops the individual into a more experienced technician with greater responsibilities and rewards. The college, then, provides training and education which allows the entry-level technician to become fully productive in the shortest possible time. This is not to say that all graduates go into industry as entry-level technicians. Some, in fact, do qualify for higher-level positions. Nevertheless, these individuals must still undergo further training to become fully productive.

Industry surveys should be taken at three-year intervals and results evaluated by the department in reference to subject matter being taught.

AVIATION ELECTRONICS
Airport Center
Martin Wolf, Donald Chase, Barry Weintraub

1. Programs

The program in Aircraft Electronics Technology offers instruction in electronics with an application to aviation communications and navigation systems, and to automated systems that include digital, analog, microprocessors and air data computers.

Students completing the program may be employed in avionics or any other electronic field where a strong technical background is required.

There is both a certificate and an A.S. Degree offered. The certificate is offered for those students who do not complete the general education requirements for the A.S. Degree.

The Airport Center also has an FAA certified radio repair station with a class III rating. The only college in the United States with this class rating.

2. Delivery Systems

The teaching methods used are the traditional lecture and lab set-ups. However, because of the small numbers of students, individual instruction is given in the lab. To augment the above approach, audio-visual aids, movies and video cassettes are used. All of the Aviation Electronics courses are divided up into 6 week modules (3 per semester).

3. Faculty

The faculty consists of 3 full-time people. There is a need for one more full-time faculty member in order to be able to teach the sequence of semester courses that are required to keep the students in the program. With 3 instructors, the department is unable to offer the 4 semester sequence each semester. Some of the faculty have worked for the airlines and keep up with the literature in the field.

4. Enrollment

	Enrollment (using figures of 1st Census F'81)	WSCH
Day	54	1080
Evening	12	72
Total	66	1152

Overenrollment of classes from census F '81:

		Total Classes
Day	1	4
Evening	0	1
Total	1 Class	5

The enrollment is good according to Chase. The shop classes have a limit of 25 and often at the end of the semester there are 10. There is a limit on how many students can be enrolled because of three factors: safety; the practical matters of teaching aviation electronics; and small size of the rooms. Classes can't be over-enrolled because of safety.

5. Students

All classes are in the day. The students are in their twenties and some are employed. None of them have an aviation background. The students are mostly Caucasion but include Blacks, Hispanics and a few women. There are some workouts especially in the second and third semester. Many students came from state colleges to be retrained.

6. Equipment

The equipment that the Airport Center has is "excellent in quality and poor in numbers." Most of the equipment has been acquired from VEA Funds. The present need is for more of the present equipment and some newer equipment. Most of the surplus equipment is worthless. Hewlett-Packard has given them some very small pieces.

Government surplus is a possible source but it is one that is difficult to tap. By the time some equipment is located in surplus, the department's money is already committed to other places.

The specific need is for 20 Oscilloscopes and some Meters and Signal Generators with both AM & FM capability and digital and microprocessor trainers. All three persons stressed, however, that the greatest need was for facilities. The classrooms and storerooms are simply too small for the number of students and equipment.

VEA Allocations for Equipment

1979/80	Aircraft Electronics/Technology	$73,501.00
1980/81	Aircraft Electronics/Technology	53,570.00
1981/82	Aircraft Electronics/Technology	976.00

7. Special Programs and Grants

8. Remedial Programs

The students at the Airport Center need more preparation in in math and English. The three persons interviewed recommend that the remedial work not be done before the program but during their training in order to use the students love of electronics as a reason for studying English and Math. At present there is no testing of entering students, but there are plans to test in the future. The only remedial programs available now are tutoring.

9. Relations with Industry

The department has good relations with industry. There are no on-site classes, but there is a class taught at the Airport Center for Continental Airlines. Both Grounds and Sutton, instructors in the department, consult with industry.

There will be a CWETA program on the B-1 project at Rockwell International that will begin in March which will train people in tool and die making (helpers).

The department has an Advisory Committee that meets once a year and advises the Center on the needs of industry. The Center has a good relationship with the members of the Advisory Committee.

10. Employment

The placement of students is excellent, over 90 percent. There is a spinoff in which graduates of aviation electronics get jobs in general electronics.

11. Coordination with Other Colleges

The Center coordinates with the Avionics Program at Mission. Dick Martin, formely of the Airport Center, went to Mission and started their program in Avionics. There is coordination between the two programs in equipment and curriculum.

12. Expansion and Improvement

Expansion and improvements are needed in all phases. The program needs updating continually so it can keep up with changes in industry. The program needs continual analysis and critiquing. Teachers need time to do this and develop a new curriculum as it is needed.

If there were more space and the program was advertised, then it could be three or four times larger.

The department has an Apple Computer with which they want to tie in to the aircraft industry. The Center would like to add a course in CADCAM (Computer Aided Drafting and Computer Aided Manufacturing). The airplane is becoming more computerized and electronically complicated, and there is a need for more electronics technicians to service it now and in the future, thus creating a larger demand that the department will be able to meet.

13. Needs and Problems

The Airport Center has special needs because it is isolated and carries unique programs such as aviation electronics and the travel program that are the only ones in Southern California. The faculty and the Dean believe that these programs, instead of being cut like the regular classes, should be supported through the expansion that the industry is demanding/requiring. The District has a very unique situation in the three major offerings at the Airport Center and these should be promoted to alleviate the trained manpower shortages that Southern California and the nation are suffering in these areas.

14. Future Plans

The Center would like to add a program in Marine Electronics. Such a program fits in with Aviation Electronics. Marine Electronics primarily deals with the receivers and transmitters, direction finders and radar of boats instead of those of the airplanes. Such a program would tap the potential market that exists along the Southern California Coast, especially in nearby Marina del Rey.

15. Miscellaneous

A method should be established whereby technical instructors are kept current. Some incentive program should be developed and/or a cooperative program with industry. This would allow for technical instructors to work in industry from time to time and thereby provide a type of recurrent training for the technical instructor.

ELECTRONICS
West Los Angeles
Martin Ross

1. Program

The areas of concentration in the Electronics Department are Computer Technology and Television Servicing. The department offers both an Associate in Science Degree and a Certificate in Electronics. The Certificiate curriculum is designed for those students planning to enter an occupation in electronics but who do not complete the general education requirements for the Associate in Science Degree, or have another community college degree.

2. Teaching Methods

Traditional teaching methods are used. These entail classroom instruction/demonstration and laboratory sessions to give the student hands on use of test equipment, trouble shooting and reporting procedures.

3. Faculty

The faculty in electronics at West Los Angeles College consists of one full-time member and five part-time members. Four of the part-time people work in industry, and consequently, are current. Martin Ross, the one full-time member, worked for many years in industry and still maintains contacts with industry.

There is a need for an additional full-time instructor and a full-time lab technician to take care of the equipment and the lab supplies.

4. Enrollment

The present active enrollment in electronics at West is 27 for one day class and 234 for the evening classes for a total of 261. Enrollment is low in the advanced classes such as Electronics 24 (13) and Electronics 56/57 (13). However, at present, one beginning class is overenrolled. Electronics 2 has 56 for a class limit of 45.

At present, no one has been turned away from Electronics classes at West. Because of the problem of low enrollment in some advanced classes, Ross takes the approach that he never closes his beginning classes. The inability to teach sequential classes each semester and the high attrition rate demands that he take everyone in order to have enough people left for the advanced classes. Total enrollment at West Los Angeles has tripled in electronics in the last four years.

Classes with overenrollment from 1st census of F'81: Day -0- Evening 1
Total classes: Day 1 Evening 8 = 9.

	Enrollment	WSCH
Day	30	90.0
Evening	257	1143.0
Total	287	1233.0

5. Students

Both day and evening students have a high median age, most are in their 20's through 40's. Half of the students are working in the field and are taking courses for salary improvement or promotion. Of the other half of the students, 50% are working full-time and 25% half-time. In short, only a small percentage of the students are not working.

6. Equipment

At the present time, West has all the equipment it needs but doesn't have the space or instructors necessary to utilize it. Ross bought most of this equipment four years ago when he first came to West--and has most of the essential equipment.

Ross doesn't have any continuous relationship by which he receives equipment from industry. He stated that a large percentage of the equipment is owned by the government which ends up in federal salvage where it is open to bid. Ross felt most of this salvage equipment and most of the equipment that industry might offer is obsolete and worn out.

VEA Allocations for Equipment

1979/80	Electronics	$ 00.00
1980/81	"	00.00
1981/82	"	00.00

No further VEA money has been sought due to lack of dedicated laboratories and storage space.

7. Special Programs

A course covering the FCC Radio-Telephone test (ELEC-44) coupled with other courses presently taught on campus will prepare the student for a career in the communication field.

A program in Energy Technology is presently being considered for addition to the Electronics curriculum.

8. Remedial Programs

Ross finds that his students need more preparation in English and math. Students are presently tested before they take the Electronic math courses. If they fail, then they must take a pre-math course along with Electronics 2, Introduction to Electronics.

9. Relations with Industry

West has close relations with industry. Ross worked for industry for many years before he started at West Los Angeles College and all but one of his part-time faculty work in industry. In addition, West's Advisory Committee helps him with determining the requirements in the television and digital fields.

10. Employment

The placement rate at West in electronics is excellent. All but a few students are working before graduation.

11. Coordination with Other Colleges

At present, there is no coordination with other colleges. Ross does not go to the state meetings of all electronics instructors, nor has he been given planning information regarding same. He would be interested to attend.

12. Expansion and Improvements

West would like to expand the television offerings including video-recorders and two-way radio courses (with offerings in citizens band and car telephones). Ross would like to include Electro Optics, lasers, and introduce two extra digital courses. Finally, he would like to add a program in the Electro-Medical field, which uses the computer to analyze body symptoms (such as the CAT and scan-a-sonic devices).

In order to improve his program, Ross stated that he needs adequate space (classrooms and facilities) that are dedicated to electronics. Also needed is funding to teach the intermediate courses in electronics every semester and the required instructors. At present, there is no need for equipment, but it will be needed as new courses are added.

13. Needs and Problems

The primary need at West is for dedicated lab and storage space. Most of the equipment needs are being met and in some areas there is a surplus with no space to use it.

14. Future Plans

The expansion and addition of programs is found in section #12. In summary, what Ross would like is to get adequate dedicated space and another FTE and a little extra equipment so he can better meet the requirements of industry for trained people.

In addition, Ross would like to see the melding (partial marriage) between the computer software and computer hardware programs to create a new kind

of technician (someone between a technician, a programmer, and an engineer) that would be more desirable to industry. In order to develop such a major, this process would probably require a third year, according to Ross.

B. BUSINESS DATA PROCESSING AND COMPUTER SCIENCE DEPARTMENTS

The following reports reflect on-site visits and interviews with department chairpersons and senior instructors. Each report was submitted to the departments for review.

BUSINESS DATA PROCESSING
Los Angeles City College
Harice Seeds

1. Programs

The department offers both a A. A. Degree (2 years) and a Certificate (1 year). The program has three main thrusts:

a. Cobol & Systems Analysis

b. Smaller business languages, such as RPG, (Report Program Generator--a popular business-oriented language relatively easy to learn that will allow a user to program many business operations as well as generated reports), and Fortran (for smaller electronics firms).

c. Basic-used for microcomputers

2. Teaching Methods

The teaching method consists of lecture and lab. The lab is an open kind where the teacher can't go in with the class. Seeds doesn't like this concept; she believes she can do much more if she could take her class in all at one time and work with them. Students now waste time unable to find their errors. She believes teachers should be with the students and help them troubleshoot.

At present, there are no non-traditional methods, but Seeds would like to try RPG in a block program.

3. Faculty

There are 3 full-time and 10 part-time at City. At present, the department is mobbed with students and needs at least one more FTE instructor to offer all the classes.

The faculty is fairly current, according to Seeds, by going to conferences, consulting; and the part-time faculty work in the field. Seeds herself has written textbooks on the following subjects: RPG, Fortran IV, Fortran 77. She is now working on an introductory book. She is also very

active in curriculum planning, working on national workshops and committees through the Association for Computer Machinery, a large software-oriented group.

4. Enrollment

	Enrollment (Using figures of 1st Census of F'81)	WSCH
Day	688	1992
Evening	718	2154
Total	1406	4146

Overenrollment of classes from Census, Fall '81, using 1st Census:

		Total Classes
Day	5	19
Evening	5	13
Total Classes	10	32

All the BDP classes are overenrolled. Students in many classes are not turned away but are allowed to stay until the first exam when many drop out. There is a need for another FTE in order to have enough sections.

5. Students

Day-- The day student at City is about 25 years old and usually works. Only 15 percent of the students are already in the field. They are an ethnic and racial mixture. The retention rate is about 50 percent, but some of the students who drop out return later.

Evening-- The evening student is in his/her early 30's. Many work in the field already, but usually in low level positions, and are seeking to upgrade their jobs.

Many of the students studying at City attend part-time, consequently, they take three to five years to finish the program. A large percentage transfer to four-year institutions.

6. Equipment

The Xerox minicomputer will be replaced by the Prime mini. At present, there are twelve microcomputers (Commodores) and terminals that are connected to the Honeywell computer at the District.

According to Seeds, they need to wait and see what can be done with the Prime before they completely assess their needs. There is a need for 12 more micros and 21 discs.

VEA Allocations for Equipment

Business Data Processing:	1979/80	$11,341.00
	1980/81	00.00
	1981/82	00.00

7. Special Programs & Grants

8. Remedial Programs

Students need more preparation in oral and Seeds' written communication; they spoke of the desirability of the department putting in an English requirement.

The only testing done is the English test the college gives to the students. The department does have some EOP&S tutors.

9. Relations with Industry

Relations with industry are not strong. Some of the evening faculty work in industry and provide contacts this way. The full-time faculty all consult with industry. The data processing department has an Advisory Committee that meets once a year and advises the department on the types of courses and hardware that are needed.

10. Employment

The question here, according to Seeds, is not just getting jobs but getting better jobs; many of the students already work and are studying in order to upgrade themselves. Seeds believes they need to hire a job counselor to help with placement. At present the students get hired through the evening faculty, the members of the Advisory Committees, and through faculty contract.

11. Coordination with Other Colleges

There is very little coordination between colleges as regards BDP. City has a good relationship with Southwest in which individual students may go there when City's equipment is down.

12. Expansion & Improvements

Seeds would like to see courses added in the following fields: Systems Analysis (examination of an activity, procedures, methods, techniques, or a business to determine what must be accomplished and how to do it using data processing equipment). Data base management (a systematic approach to storing, updating and retrieval of information stored as data items, usually in the form of records in a file, where many users, or even remote installations, will use common data banks); JCL (Job Control

Language--an IBM system which interprets instructions that are given to it by the user and then processes them in order to tell the central processor what to do with the user's program). Seeds would also like to teach many courses in a block program (short, intensive courses).

To do all of this, Seeds feels they need one more FTE. At present, there are 12 microcomputers; Seeds feels that they need at least twelve more to do an adequate job. She should like to see labs with 30 microcomputers in each.

13. Needs & Problems

Seeds feels that there needs to be a more integrated curriculum, which would be more consciously planned by the BDP faculty members.

In addition, she wants to develop better coordination between the day and the evening programs.

14. Future Programs

Seeds thinks that the department should expand in the microcomputer field, especially in the areas of management's use of microcomputers, and small businesses' use of microcomputers. In addition, Seeds would like to move toward an integration of accounting and data processing.

15. Miscellaneous

BUSINESS DATA PROCESSING
East Los Angeles College
Al Bremer and Cook Hadley

Introduction

One out of every eight students at East is taking a course in Business Data Processing. The BDP courses are of extremely high vitality producing 1000 WSCH or more and ranking third among occupationally-oriented areas.

1. Programs

East offers a Certificate of Completion in BDP and an A.A. in Business Administration with a major in BDP.

Classes are divided almost evenly between day and evening and eight are offered at off-campus locations. Classes are also taught Friday evenings and Saturdays.

2. Delivery Methods

Most of the courses are taught in the traditional mode, although last year a few ten week intensive courses were taught. The Department was satisfied with this intensive approach and it presented no special problems for them.

3. Faculty

The BDP Department has two full-time faculty members and 21 part-time members, 9 of which teach off-campus. There is a problem in obtaining full-time faculty in BDP, but no problem in hiring part-time members. Al Bremer, coordinator of BDP, feels that there is a need for higher salaries for BDP full-time instructors because of the higher salaries they can command in industry.

Since most of the part-time faculty members are working full-time in industry, keeping current presents no problem for them. The two full-time instructors are Al Bremer and Cook Hadley.

4. Enrollment

Total enrollment at East for all classes in BDP is 1,700. Classes are full 1 to 2 weeks after they are opened. Many classes are overenrolled; some students must be turned away and put on a waiting list.

	Enrollment (Using 1st Census figures - F'81	Census WSCH
Day	858	2557
Evening	1141	3385
Total	1999	5942

Overenrolled classes at 1st Census:

			Total Classes
Day	8	classes were overenrolled	20
Evening	16	classes were overenrolled	32
Total	24		52

5. Students

Approximately 50 percent of the students in BDP are Mexican-American and 40 percent are foreign born (Asian, Middle Eastern & European). Only 10 percent of the students are Anglo-Americans. In view of the fact that 48 percent of the service area is Anglo-American, the faculty feels there is room for recruitment from this particular student population.

There seems to be multiple causes of this phenomenon. One mentioned by the faculty is that these students go to neighboring schools which have better equipment and smaller classes. The foreign-born on the whole do better academically than the native-born. The Mexican-Americans are excellent student but are hampered by poor academic preparation. Many of the evening students work full-time. The day students are younger but many of them are forced to work.

6. Equipment

The BDP lab at East has a Xerox 530 (24K memory) and seven key punch stations; this equipment is leased through Honeywell. There are also five terminals (two are leased, 3 belong to East) that are hooked up to the Honeywell (level 66) at the District. There are four desk top computers in the Health Science Department which were acquired from the National Science Foundation. The BDP Department has access to these machines. In addition, the Department has very limited access to the IBM 370 Computer at the DWP. Bremer's approach is that it is more important to have access to up-to-date equipment than to actually have it on campus. The BDP Department is hoping to get at least 25 terminals for the Prime Minicomputer, but they need 48 to 64 to service adequately the I,700 currently enrolled.

7. Special Programs & Grants

East has three off-campus/on-site training programs. The biggest is at the Department of Water and Power at a downtown location. The DWP provides facilities (an IBM 270 computer and the rooms) to train people in BDP. Most of the students work at DWP but some come from the East campus. The college pays the instructors and grants credit for the courses. Classes are once weekly, after work, from 5:30 to 8:30. Similar but smaller programs also exist with Cal Trans and the County Health Department.

8. Remedial Programs

Students need more preparation in English and Math. At least 50 percent of the students are foreign-born and many of the others are from economically deprived backgrounds. At present, there is no testing of students in the BDP Department. There is some tutoring of students on an individual basis in the programming lab course, BDP 23.

9. Relations with Industry

Due to the fact that 21 part-time faculty work in industry, the Department has excellent relations with industry. Both of the full-time instructors consult in industry. In addition, there are on-site courses with DWP, Cal Trans and County Health. The Department's Advisory Committee meets once or twice a year and advises the department on equipment and employment requirements in the various branches of BDP.

10. Placement

According to Bremer, East's graduates do very well in obtaining entry-level positions.

11. Coordination with Other Colleges

Bremer stated that more coordination is needed. At present, when equipment at East breaks down, they go to Harbor to run their programs.

12. Expansion & Improvement

More sections are needed because of present overenrollment and the necessity of turning away students. With a student enrollment of 1,700 in BDP much more equipment is needed.

13. Needs & Problems

The Department needs more equipment and more instructors. Bremer stressed the need for up-to-date equipment that is actually used in the companies the students are likely to be working at; most of the equipment at East is out-of-date. There is also a need for higher salaries for full-time instructors to enable the college to attract qualified people that would otherwise work for higher salaries in industry.

A special problem is caused by the lack of adequate equipment to service all the enrolled students. Occasionally when the computer equipment breaks down or the students can't get access to the Honeywell, they are forced to suffer the loss of a letter grade in the course. This occurred with about 100 students in the day classes and with others in the evening last spring semester.

14. Future Plans

Bremer would like to add more courses in microcomputers and minicomputers. He also would like to start training computer operators. Bremer believes that there is a need to train people that are able to repair automobile computers. Finally, he would like to add a course in Basic (programming language) that would teach students to program their home computers.

15. Miscellaneous

16. Suggestions

17. Comments

The BDP Department at East is a large one and has the potential for high growth in the future.

The greatest needs seem to be up-to-date equipment and more full-time instructors.

BUSINESS DATA PROCESSING
Los Angeles Harbor College
George Potter and Robert Wrenn, Chairman of Business Department

Introduction

The Master Plan 1981-82 predicts a 50 percent increase in computer programming courses because new facilities will soon become available to offer additional evening courses in Business Data Processing.

The new all-college computer facility/classroom building is to be shared with the Social Science Department.

1. Programs

The department offers both an A. S. Degree and a Certificate in Business Data Processing.

The A. S. takes two-years while the Certificate only one year.

2. Delivery Systems

The primary teaching mode used in the department is one of lecture and lab. However, Business Data Processing I used to meet daily for half a semester but is not currently taught in this manner. Some Word Processing Machine courses are open-entry/open-exit and some Business Math courses are competency-based.

The Business Data Processing faculty emphasizes a variety of delivery systems, including videotapes, self-paced slide-tapes, computer exercises, simulations, field trips, guest lecturers from industry, CAI, small group gaming, and the use of computers in the classroom to demonstrate programming techniques and operating system functions.

3. Faculty

There are 4 FTEs and 8 part-time faculty. As with other colleges, they have difficulty getting qualified faculty because of competitive industry salaries. They have all part-timers at night. The department hold some meetings in the evening so that the part-timers can participate. Potter works as a consultant with industry.

4. Enrollment

	Enrollment (using figures of 1st Census of F'81)	WSCH
Day	695	1891
Evening	811	2433
Total	1506	4324

Overenrollment of classes from Census, Fall'81 using 1st Census:

		Total Classes
Day	7	23
Evening	3	8
Total Classes	10	31

The department is consistently overenrolled in data processing. Virtually all of their introductory and programming classes either must turn students away or accept over-crowding of classrooms during the first weeks. Students are advised to try again next semester. They are not able to have enough sections because of not enough positions in the data processing area and a persistent shortage of classrooms.

5. Students

Students are hired out of the program. The average age of the day student is 27-28 and the evening student is 5 or 6 years older. About 90 percent of the day students work, whereas 99 percent of the evening students work.

Women comprised about 54 percent of the students. The ethnic and racial breakdown is the following:

Black	21%
Hispanic	30%
Asian	8%
Samoan	8%

The attrition rate is 35 percent day and 30 percent night in BDP compared with 40 percent in the college as a whole. Students need more preparation in math and English.

6. Equipment

The lab had a Xerox 530 but this is being replaced by a Prime Minicomputer with 24 terminals. In addition there are 15 Apple II Microcomputers and 3 TRS-80's from Radio Shack. Potter claims that the Prime has insufficient software and they also need more microcomputers. Enrollments are growing rapidly. This program recently moved into the Nursing Learning Lab and is using it as a computer lab. If growth continues at this rate, faculty will be inadequate. They are opening 3000 sq. ft. of computer lab. The District has committed $134,000 to convert the Nursing Learning Lab into a computer lab which will permit 33 microcomputers to be wired into an interactive system along with 24 terminals connected to both a microcomputer and the District Honeywell computer.

Donations from industry have been out-dated equipment for which they have no need. They are no longer interested.

VEA Allocations for Equipment

Business Data Processing:	1979/80	$ 500.00
	1980/81	40,000.00
	1981/82	21,500.00

7. Special Programs

Harbor has a recruitment program for the handicapped run by Steve Hirshfield and Farrah Fisher.

A full-time learning disability specialist was hired, and a microcomputer purchased for use in computer-assisted instruction for handicapped students.

8. Remedial Programs

Research has been done on remedial education, and the recommendations are awaiting approval.

At present, students are sent to the Learning Resource Center.

9. Relations with Industry

The department has excellent relations with industry. Some of the full-time faculty consult in industry.

Contract Education-- None at the present time.

Advisory Committee-- This committee composed of representatives from business meet once a year to discuss programs and learning objectives. At that time, the business representatives recommend new courses and hardware.

10. Employment

Because of the sustained need for employees with computer training the graduates have no trouble finding jobs. They lose a considerable number of students because they obtain employment before they finish all of the courses required for either the A.A. degree or the certificate. They have a list of openings, furnished mostly by the members of the Curriculum Advisory Board, that is never completely filled.

11. Coordination with Other Colleges

At present there is no districtwide coordination. Faculty often meet each other at conferences and talk about the need, but there is no system for doing this.

12. Expansion & Improvements

The primary need is for a building to house the Business Division and the Campus Computer Center. Faculty offices are small and inadequate; classrooms are too small, and there are not enough of them; the computer lab is makeshift, and does not have enough room for the equipment needed.

The greatest need for expansion is in data processing and word processing.

13. Needs - Potter

An ideal program based on a six year master plan would include a complete microcomputer program with at least one unit for every fifty students. Fifty micros could be phased in each semester until there were three-hundred on campus. This could provide basic computer fundamentals for every student. He suggests Apple II. A more sophisticated micro, Radio Shack's TRS-80, would be for the more advanced students or one specializing in this field. An Apple would cost about $2000.00 per station and the TRS-80 about $4000.00.

He suggested a total of 25 TRS-80 Model 16's. Currently, there are three TRS-80 Model II's on campus. For the minicomputer, he recommends the Digital Vax 11-70 because of the superior availability of software.

The Annual Report calls for additional computer equipment to meet current and future interest in computer technology.

What is needed is a change of focus where computer literacy is taught on a broad scale. Software is the way to computer literacy, according to Potter.

14. Future Plans

According to Potter, there is a need for a districtwide master plan for BDP. He believes it is useless for the campuses to plan on their own without a District plan.

Because of the nature of BDP, where equipment and programs are inextricably bound (you cannot teach a course in Cobol without the proper equipment), Potter believes that you can't start planning future programs without knowing what equipment you will be able to get.

What is needed is leadership and decisions about educational objectives.

Wrenn: During the next five years our department must move ahead vigorously to acquire the equipment and facilities to teach the skills needed by the rapidly advancing technology of our business community. We need to develop courses in such subjects as computer graphics, teleprocessing, distributed data processing, data base management, word processing, and programming languages such as PASCAL and Ada.

We need to learn to use computer technology in teaching, to increase the effectiveness of learning as well as to extend the reach of our faculty. Because of our current extensive use of computers and the expertise of our data processing faculty, our department should assist other departments within the college in the acquisition and use of computer based education.

An important element in our curriculum development is the need to be able to predict and anticipate the skill needs of business.

15. Miscellaneous -

Potter: I feel that our greatest need is for a strong, sustained, coherent program that will insure the continued development of computers in education. We need to do a considerably greater amount of teaching about computers, and we need to awaken faculty and administrators in all disciplines to the enormous potential of the computer as a teaching tool. It is ironic that we are located in the center of the greatest concentration of computer power in the world, but we are woefully inadequate in our computer class offerings and in our uses of computers in teaching.

16. Suggestions

Potter suggests that what is needed is better direction and management rather than more money being placed into programs. For instance, the Honeywell runs counter to the movement of industry. Such important computer programming languages as APL cannot be taught on Honeywell or Prime since it is an IBM language. He feels that teaching is constrained because of misdirected resources.

Wrenn: It is strongly suggested that a comprehensive plan be developed at District-level that establishes long-range goals for computer education. Each campus must be given the opportunity to contribute to the establishment of these goals. In-depth consultation with industry must be effected to provide realism and adaptability. While these goals must, of necessity, be in harmony with the overall purposes of the District, and in a broader sense, the state, they must not be established by district staff.

After the goals have been derived, specific schedules for their accomplishment must be established, and funds must be budgeted for the purchase of equipment and the acquisition of facilities.

The past 15 years has been a period where LACCD has lagged dangerously in computer education. There has been little understanding of this need, and even less cohesive planning. The majority of the leadership to acquire adequate capability has come from the data processing faculties on the individual campuses, with the predictable result that program development has been sporadic, uneven, and uncoordinated. A disproportionate amount of our resources has been spent on a strongly centralized administrative data processing center, at the expense of our educational data processing effort.

COMPUTER SCIENCE DEPARTMENT
Los Angeles Pierce College
Charles Alvarez, Chairman

1. Programs

There are three main programs: 1. Computer Programming-preparation for systems analyst; 2. Business Data Processing-programming and computer management in the area of business applications; and 3. Computer Technology-maintenance and field service.

2. Teaching Methods

The primary teaching mode is the traditional lecture-lab. One course is offered "Man in the Computer Age", which takes a humanities approach.

3. Faculty

The faculty consists of 8 full-time instructors, 22 part-time instructors, and 2 classified lab assistants. Faculty are teaching an average of approximately 600 to 650 WSCH. (Classes are crowded and many students are unable to get in classes.)

Because of the large teaching load, faculty have had an extra burden placed on them in order to stay current in their field. Instructors in this discipline are involved in contact time with business and industry. They work with industry to place their graduates in addition to teaching and preparation.

4. Enrollment

	Enrollment (Using 1st Census Figures - F '81)	Census WSCH
Day	1478	5521
Evening	1169	4173
Total	2647	9694

Overenrolled classes at 1st census:

		Total Classes
Day	20	29
Evening	21	23
Total	41	52

Programs are overenrolled; the department is facilities bound, that is they haven't the classroom space nor the terminals to overenroll most classes. Classes fill up early in registration resulting in closed first semester classes prior to new student enrollment. One class which had 30 enrolled generated a waiting list of 112.

5. Students

About two thirds of the students who enter Pierce's program are recent high school graduates. Most are in their mid-twenties. Students who attend in the evening are employed and are taking the course to upgrade skills.

6. Equipment

Software - Equipment is varied: some is outdated and not currently in use. The new Prime Minicomputer is installed.

VEA Allocation for Equipment

1979/80	Computer Tech	$23647
1980/81	Computer Tech	5629
1981/82	Computer Tech	$27279

7. Special Programs & Grants

A special international internship program is currently operating, with the Mexican Government financing students to attend Pierce (contact D. Lee Ross, Asst. Dean of Instruction) sponsored by the League for Innovation. No additional screening takes place. Four students are currently in the program. Ten more students are interested in coming to Pierce. Pierce has special orientations for the students and counseling in Spanish.

8. Remedial Programs

There are few remedial programs geared directly to this discipline. Students need greater math proficiency, particularly Algebra. And they have serious deficiencies in communication.

9. Relations with Business and Industry

Pierce has a large outreach program. Classes are taught at eight or nine local industry sights.

They have an excellent program involving companies coming on campus to recruit students for jobs. The Technology Program places 100 percent of its students. At least 90 percent of the Business Data Processing students are placed.

Advisory Committees

Three advisory committees meet once or twice a year to review curriculum, job placement strategies, and equipment.

10. Employment

11. Coordination with Other Colleges

Pierce participates on the Computer Science, Business Data Processing Committee which meets monthly when there is a need. An informal policy exists with sharing of curriculum material. Pierce is a member of the Tri-Valley Alliance.

12. Expansion & Improvement

This department has a significant need for enough facilities to accomodate their burgeoning enrollment. In order to accommodate students, classes have even been held in the horticulture potting shop.

Equipment needs are varied. For Software programs, a single disc drive is not sufficient for their purposes. A 300 megabyte disc is needed for backup (the Prime has only 1 disc drive). At least two megs of memory is needed. A system is needed that employs multi-level technology, that reflects gate-array technology (i.e., current generation).

For hardware programs, a number of items are needed. Since microprocessor technology is the newest technology, new high frequency oscilliscopes are required (the old ones are not fast enough for the new computers). Eq-ipment should include a CDC 2297 disc drive, and a high speed line printer. A new CAD/CAM curriculum should be instituted.

13. Needs and Problems

See #12.

14. Future Plans

Pierce would like to see computer facilities in satelite stations campus wide (decentralization of Computer Services).

15. Miscellaneous

16. Suggestions

Pierce would like to see time allowed for staff development, for additional training or renewal in their field.

BUSINESS DATA PROCESSING
Los Angeles Mission College
Ken Gorham

Introduction

The BDP Department is of extremely high vitality. This past fall about 80 percent of the classes in BDP were completely filled, according to the Project Renewal Report. The BDP Department is unable to offer any additional sections because it is limited by the lack of equipment in the computer lab.

1. Program

   The program at Mission offers both an A.A. in BDP,60 units,and a Certificate after 26 units. At present, the A. A. is an option under Business but it will soon be separate. The Department has courses in all the languages (Cobol, RPG, Basic, Bal).

2. Teaching Methods

   The methods used are the traditional ones of lecture and lab which provides a combination of theory and hands-on experience.

   According to Gorham, the program at Mission is quite vigorous and he believes that programming classes can't be taught in a short period. If you had the maximum equipment then it could be done in a shorter time.

3. Faculty

   There is 1 FTE and four hourly instructors. According to Gorham, there is a need for a second instructor.

   Three of the hourly faculty work in industry and the fourth who is an instructional assistant manages the lab. These four people help keep Gorham up-to-date. Gorham also is an independent consultant.

4. Enrollment

   The current enrollment is 350 to 400. They were forced to turn away about 20 students in the Cobol class. This Spring Semester they will offer a second class in Cobol and Basic.

	Enrollment (using 1st Census figures - F '81)	Census WSCH
Day	80	190.0
Evening	400	796.0
Total	480	986.0

Overenrolled classes at 1st Census:

		Total Classes
Day	1 class was overenrolled	4
Evening	3 classes were overenrolled	15
Total	4	19

5. Students

The average age of the students is 30, most of whom are working. All but one of the 10 or 11 classes the department offers is at night. The ethnic makeup is the following:

White	50%
Chicano	40%
Black	10%

There are many women reentering school and they make up 50 percent of the students and 80 percent at the end of the courses and programs.

Occasionally there are some workouts (students drop out to work). The dropout rate for the Introductory and Programming Courses is 40 percent.

6. Equipment

The comptuer lab has 5 Apple II Microcomputers, 1 Industrial Microcomputer with 2 tubes and 1 outdated IBM Systems III Minicomputer which was donated by a company in East Los Angeles. The Systems III Computer which is from the second generation also has discette entry stations. The cost for maintenance and software for the IBM III is $700.00 per month. The lab has completely done away with punch cards. Last year the department received $17,000 from VEA Funds and $10,000 of District money.

The department needs are 15 Apple Microcomputers and a new minicomputer to replace the Systems III.

VEA Allocation for Equipment

1979/80	Bus. Data Proc.	$16245
1980/81	Bus. Data Proc.	9866
1981/82	Bus. Data Proc.	-0-

7. Special Programs & Grants

8. Remedial Programs

According to Gorham, Math is not necessary for Business Data

Processing. There is some difficulty in English, especially among Hispanics and, consequently, there is one Bi-lingual class. Gorham estimates that about 10 percent of the students have problems with English. The department has no remedial programs but simply refers the students to the college programs. At present there is no testing of entering students.

9. Relations with Industry

Ken Gorham, the only FTE, consults with industry and three of the part-time instructors work in industry. There are no on-site classes at present but through the independent study class, 185, the department is developing an internship program with industry. So far three students have been hired out of this program by Price-Fisher. The intern students are given several actual programming assignments from a local company which they complete as if they were working for that company.

10. Employment

There is a "Catch-22" of sorts in the data processing field: it's hard to get hired without two years of experience and you can't get experience unless you're hired. The students, however, that finish the Certificate Program with an A or B get jobs, primarily with part-time faculty's help. Gorham wants to create a data base of the jobs available to students.

11. Coordination with Other Colleges

Outside of the District BDP/Computer Science Committee, there isn't much coordination with other colleges. Most colleges view themselves as independent and each other as competitors. Gorham who teaches two classes at Valley College sees Valley as a resource.

12. Expansion & Improvements

There is a need for a modern minicomputer to teach JCL Data base and operations and sufficient Apples to satisfy student demand. Because the present facility is too small there is need for a new facility. It is necessary to wire the present facility correctly at a cost of about $10,000; the old wiring causes interference on the computers.

13. Needs & Problems

The primary need is for facilities and equipment, an additional instructor and an additional EDP instructional assistant.

14. Future Plans

Gorham wants to expand in the direction the program is going-teaching the primary programming languages.

He is also thinking of adding an option in computer maintenance.

Gorham believes that data processing is going toward the analyst side because there will be less need for programming in the future. Data base (where a computer can write a program for the company based on its data) is the most crucial area now.

15. Miscellaneous

16. Suggestions

COMPUTER SCIENCE DEPARTMENT
Southwest College
Al Avins

1. Programs

Beginning courses are offered in workshops (modular structure) which meet six hours weekly combining Principles of Business Data Processing with Business Data Programming. This combination is popular with the students since it provides hands-on experience early in the training.

2. Delivery Systems

The principal teaching method is lecture and lab.

3. Faculty

There is presently only one full-time faculty person. Courses are taught by seven part-time instructors who also work in industry. An additional full-time permanent instructor has been requested. For lab,faculty rely on student workers, an instructional assistant, and student tutors.

4. Enrollment

	Enrollment (using figures of 1st census of FY 81)	WSCH
Day	404	1104
Evening	468	1476
Total	872	2580

Overenrolled Classes Using 1st Census figures

		Total Classes
Day	6	11
Evening	7	9
Total	13	20

5. Students

At least half of the classes have mature students from the late twenties to forties. Approximately one-third of the students are employed.

6. Equipment

The department has a Xerox Minicomputer which is due to be replaced with the new Prime (with thirteen terminals). Their five Apple IIs are adequate for the present. However, they anticipate additional needs: Computer Operations-Data Entry is a very viable program for which they need key-to-disk stations. A two station unit costs approximately $5,000 and provides access for two students at one time.

VEA Allocations for Equipment

Computer Science Department	1979/80	$ 00.00
	1980/81	00.00
	1981/82	00.00

7. Special Programs & Grants

$90,000 was secured for administrative costs for one year. A CETA program was successful as far as students and instruction (the program had other difficulties). Four hundred students applied for training, forty-five were chosen. In general funding for equipment has come from VEA (Apple IIs).

The grant for $90,000 is to train students on campus and at a business site as students receive on-the-job experience and access to potential employers. The firm involved in the grant is providing facilities and instructional support.

8. Remedial Programs

All students take an entry test in English and math; however, students still elect to enter the class even if they do poorly on the test. Tutoring is available. PLATO (computer-instructed learning in English and math) is available in the learning lab. Some of the students have serious difficulties in reading which require a more basic approach than the computer system. This necessitates working one-on-one. They need a basic reading series which does not "talk down" to these mature students. Students who enter with deficient skills generally drop the course later in the semester.

9. Relations with Industry

A committee meets to advise on equipment and curriculum. Some of these companies hire Southwest students such as TRW, Bank of America, and Hughes.

10. Employment (Placement)

The department can place more students than at present but because of instructional shortages, staff is not available to pursue a placement program.

11. Coordination with Other Colleges

Planning on course content and programs has been lacking. Most coordination is based on equipment procurement for the campuses.

12. Expansion & Improvements

The Computer Science program can grow in certain specialized areas such as Data Entry, Computer Operations, and Data Communications if additional faculty were available and lab space and equipment were procured. In addition, Word Processing and Computer Science programs could interact to train more students and provide increased employment opportunities as facilties and software were provided.

13. Needs & Problems

Though their programs are growing, they have limited class space and instructors. Al Avins teaches 18 to 20 units most semesters. They need new funding for instructors so that they do not have to rely so heavily on student workers. Most of their programs are entry level, thus students require assistance in the lab.

Students would have greater success in securing jobs if they could learn JCL (Job Control Language) which is an IBM language. Southwest can get access to time sharing for IBM for approximately $1,500 to $2,000 annually.

14. Future Plans

15. Miscellaneous

16. Suggestions

Al Avins sees the need for a District-wide coordinating committee as well as the Business Data Processing/Computer Science Committee to do long range planning.

Faculty settled for the Prime Computer because the Xerox was falling apart (they needed equipment right away), and because of the cost. Avis feels DEC is a better computer because it is education oriented, used extensively in four year schools which enables students to transfer easily into four year programs, and because it has a large supply of software.

17. Comments

It would seem advisable to have at least one other full-time faculty to help plan for the department, etc. The program, as it is now, seems very limited in future growth. A remedial program geared to computer and technology would do well here.

BUSINESS DATA PROCESSING DEPARTMENT
Trade Technical College
Ann Lucas

Introduction

The Business Data Processing Department at Trade Technical is part of the Business Department and produces high WSCH ranking 11th (3900 WSCH for Fall 1981, FTE 7.4 WSCH/FTE = 527).

1. Programs

Trade Technical offers both an A.A. with specialization in Business Data Processing and a Certificate of Completion which is a one-year curriculum. The program is business-oriented and stresses the different computer languages. Key punch is being phased out and will be replaced by CRTs (Cathode Ray Tube) terminals.

At present Ann Lucas estimates that their program is about five years behind what is happening in industry.

2. Delivery Systems

Most classes are taught with the traditional lecture/lab combination and the only deviation is the to-be-arranged classes. Some video instruction is also offered but on a very limited basis.

3. Faculty

The department has three full-time and fifteen part-time that all have Masters Degrees. The excellent part-time faculty works in the computer industry; they are 100 percent current, and they have excellent input to the Trade Technical program. The full-time faculty on the other hand stays current by going to conferences and workshops.

4. Enrollment

	Enrollment (1st Census of FY 81)	WSCH	Over-enrolled Classes	Total Classes
Day	807	2584	12	19
Evening	681	2196	11	16
Total	1488	4780	23	35

All BDP 1 classes are over-enrolled. The BDP 1 courses are booked to capacity and Ann Lucas was forced to split one class and bring in hourly instructors. Students must be turned away and are put on a waiting list for the next semester. More sections are needed

but the department is not able to offer these courses because they are understaffed. There is also over-enrollment in Word Processing courses and students must be turned away and put on a waiting list.

At present there is an 80 percent retention rate each semester but Ann Lucas believes this will go down because of limited facilities which cause students to seek training elsewhere.

5. Students

The students studying BDP at Trade Technical are a mixture. About 50 percent are Black and many of the others are from foreign countries. There has been an increase in Asians, many of whom are recent arrivals.

Day--Many of the day students are employed; about 40-50 percent, and are younger than the evening students. May of the day students work evenings and nights.

Evening--The evening students are more mature and older than the day students. About 95 percent of these students are employed and the majority are interested in job achievement or a career change. Some students have a degree in another field from a state university and return to Trade Technical for retraining in BDP.

6. Equipment

At present the Data Processing Lab at Trade Technical has an IBM Systems 3 and 23 IBM Key Punch Stations. In addition, there are 4 IBM-2741 Terminals and some Televideos. The department will be getting the Prime Minicomputer and has requested 22 terminals. The department must use its own money for the Prime and the micros it wants to order. The department has equipment offered by industry but must turn it down because it is out-of-date and would normally require more repair or maintenance than new equipment would cost. Trade Technical receives approximately $500,000 per year from various parts of the Vocational Educational Act (VEA). Ann Lucas thinks she will need more than the 22 terminals they are getting and added that she didn't think the Prime would be able to handle the volume of student use.

VEA Allocations for Equipment

Business Data Processing:	1979/80	$ 7,500
	1980/81	8,210
	1981/82	14,042

7. Special Programs & Grants

No special programs other than the to-be-arranged classes.

8. Remedial Programs

All students that enter Trade Technical are tested in math and English and are assigned at their particular level. All students like this method and are grateful that someone is telling them what they need to do. Another way of remedial training is that teachers refer students to remedial courses and to the Learning Resources Center where they can receive tutoring from VEA tutors or from EOP&S peer tutors. The department refers students to EOP&S as tutors and they do very well.

9. Relation with Industry

There is a BDP Advisory Committee which helps the BDP Department determine its needs as it relates to business and industry. The department is in constant contact with the committee members. The evening staff, which is part-time, either works in or consults with industry; the regular staff is too busy to consult. There are no on-site training classes or contract education. There is some contract education in Office Administration; 12 legal secretaries are being trained at the Department of Water & Power under a contract between DWP and the District; secretaries at DWP are being upgraded under a straight contract and the Department last summer trained 200 students for the City of Los Angeles in Business, English, Office Machines, and Typing under CETA. There is also a program in Community Services in BDP and Word Processing. Ann Lucas feels she could do more in contract education if she didn't have to teach in addition to departmental duties as well as coordinator functions. There are also outreach classes with the Internal Revenue Service and the County Department of Public Social Services.

10. Employment

It was very difficult for Ann Lucas to answer this question because she said she has no data on placement of Trade Technical's students. She has started a new system that will record placement monthly and also have an exit interview with each student. At present, placement takes place through the Placement Office, instructors or the employers that call. She does know that last year's graduates are all employed and that, in general, there is no problem with employment. In addition, some evening teachers are personnel managers and they hire some of their students.

11. Coordination with Other Colleges

Much coordination goes on through the BDP/Computer Science Committee where they discuss their programs and try to make them uniform.

12. Expansion & Improvements

BDP will definitely expand, but there is a need to revise it and make it more current to better serve the students and businesses. Faculties need to be expanded. The department needs two more full-time and a part-time instructional assistant. There is a special need to expand in Word Processing; Ann Lucas would like to see this field merge with Business Data Processing.

13. Needs & Problems

At present there are no special needs or problems, simply a need for more equipment, staff, and facilities. Occasionally, students are not able to get to the equipment and, consequently, they can't finish their work.

14. Future Plans

Ann Lucas would like to see a computer center established on campus that would house all the computer equipment and could be used for all programs such as Electronics, Math, Science, BDP, Word Processing, and all computer-assisted instruction. This center would be economical and could serve more students. There would be more equipment and, consequently more students would be attracted. This center could also be open 24 hours a day and the college could contract work with other sources and make money. In addition, A. Lucas wants to merge Word Processing with BDP. She believes that all managers should know how to use a word processor. In order to fill this need the colleges could contract to train these people.

15. Miscellaneous

The Word Processing Lab has the following equipment in a very small room:

1. Vydec
2. AB Dick
3. Memory
4. Mag Card

There is a need for enough equipment for 30 students at a time if facilities were adequate. A short visit to the Learning Resources Center showed that they have a lot of equipment to help improve the students' basic skills. For classes there are two kinds of tutors available, VEA Tutors in vocational fields and EOP&S peer Tutors for people that qualify under EOP&S.

BUSINESS DATA PROCESSING DEPARTMENT
Valley College
Douglas Arter, Chairman

1. Programs

The Business Administration Department offers a Certificate in Business Data Processing and Computer Science which takes one year to complete. If the student completes the General Education Requirements and additional courses to reach the 60 unit minimum, he/she can receive an A.A. or A.S. Degree.

2. Delivery Systems

The department uses the traditional method of lecture and lab. There is also a Computer Science Modular Program Phase I and Phase II which is the equivalent to first and second year. Under this program, the student must be enrolled in four classes concurrently and in addition be given assigned projects which require the use of equipment in the Campus Computer Center of a minimum of 100 to 150 hours in Phase I and a minimum of 200 hours in Phase II.

3. Faculty

There are four full-time faculty and 23 part-time faculty. The part-time faculty almost all work in industry. The full-time faculty have industry contacts and also consult and attend seminars.

4. Enrollment

	Enrollment (Figures of 1st Census of Fall 81)	WSCH
Day	1058	3174
Evening	1326	3978
Total	2384	7152

	Over-enrollment of classes, 1st Census Fall 81	Total Classes
Day	13	26
Evening	13	30
Total	26	56

Classes are over-enrolled and there is a waiting list; all sections close before the semester begins. There are not enough sections because there is a lack of money and space in the evening.

Students

The day students are about 20 years old and 50 percent are working. They are mostly Caucasian with some Asians and Hispanics and 5 percent Black. The evening student is about 27 years old and 90 percent are working.

6. Equipment

The present equipment will be replaced by the new Prime Minicomputer with 48 Prime terminals. There will be a RJE connection to the downtown Honeywell Computer and a RJE to a private IBM at Litton Mellonics. All of the equipment is bought from general funds but the department will ask for VEA Funds for necessities. Now the need is for approximately 15 minicomputers.

VEA Allocations for Equipment

Business Data Processing	1979/80	$ 00.00
	1980/81	00.00
	1981/82	00.00

7. Special Programs & Grants

8. Remedial Programs

All the students need more training in English. Math is not that necessary for Computer Science. At present there is no testing of students. There are no special remedial programs, but the student workers in the lab help the students with any problems.

9. Relations with Industry

The department's members have established contacts with local companies and these companies then hire their students. Douglas Arter has negotiated with Great Western Bank of Northridge for on-site training at the entry-level in BDP that will be presented as a Modular Program.

The department has an Advisory Committee which meets once a year and advises the department in the needs of industry.

10. Employment

The employment or placement rate is fair. It is difficult for graduates to get jobs, because the companies want people with two years of experience. Recently, Lockheed has taken about seven and Security Pacific Bank about fifteen to twenty students from Valley. Doug Arter hopes this will lead to more graduates being hired at these companies.

11. Coordination with Other Colleges

The District has a BDP/Computer Science Committee where different members consult each other and exchange ideas.

12. Expansion & Improvements

Doug Arter would like to expand his department's microcomputer offerings.

13. Needs & Problems

The department is outgrowing facilities and needs more lab space especially for the new Prime equipment that is coming. There is a need for a permanent classroom near the lab so faculty can bring their classes to lab. Also needed is at least one more FTE. In addition, the department needs about 15 microcomputers in order to teach this area.

14. Future Plans

Douglas Arter sees the objective of his department to be occupational training and he wants to expand his facilities to support this kind of training. In addition, he would like to improve relations with industry in order to increase the chances of placing his graduates. Once you place students in a company, it is easier to place others in the same company, according to D. Arter.

Arter also wants to set up an internship program so his students can apply the theory they learn in class and also get paid for it. The Electronics Department at Valley did have an internship program in past years.

COMPUTER SCIENCE/BUSINESS DATA PROCESSING DEPARTMENT
West Los Angeles College
Carl Feingold & Robert Fagen

1. Programs

There is a single department at West with two tracks with the same requirements. The two tracks in the department are the following:

> One in computer science with an emphasis on math and science, and another in business data processing with emphasis in accounting and business.

The core or the requirements in these two programs are the same, but the electives are different. The department offers both a certificate (30 units/one year) in Business Data Processing or Computer Science and an Associate Degree in both of these fields.

2. Teaching Methods

The beginning courses generally use only the lecture method, while the others use the classic method for Computer Science or BDP of lecture and lab. The department doesn't employ non-traditional methods, because they do not have enough instructors. In some courses, there is a system designed by Robert Fagen of using a microcomputer to illustrate what is being taught on two elevated television screens. Some of the part-time instructors, at Fagen's encouragement, have used this approach in the beginning courses. This method of using computers to teach computing is a unique approach that is not seen elsewhere in the District. Eventually, there are plans to put many terminals in this classroom that would be hooked up to the larger computers in the nearby lab. The terminals will be hooked up in series so that what the students enter on their terminals will appear on all the television screens and the elevated monitors.

In addition to use during lectures, there is also the possibility of hooking up these terminals separately to the nearby lab so that this room could be used as an extension of the laboratory.

The Discovery Microprocessor described in the equipment section is located in the administration section of the campus. Students from the course in BDP 31 will do assignments that will be used to put college records and information on the computers. This will not only help the administration with its work, but it will give the students on-the-job training.

3. Faculty

There are two full-time instructors at West, Carl Feingold and Robert Fagen, in addition to the nine part-time instructors. The large introductory courses, which start with 80 students and end with 50, need to be divided into smaller sections; however, there is insufficient faculty to do this.

All the faculty at West is current. The part-time personnel all work in industry and business and are able to teach their students the latest techniques used in business and industry.

Robert Fagen is a Management and Technical Consultant at the Jet Propulsion Laboratory, California Institute of Technology and other institutions. Carl Feingold attends seminars and follows the literature in addition to having written textbooks.

4. Enrollment

Enrollment figures

		Enrollment (using the figures of 1st Census F'81)	WSCH
Day	BDP & COM. SCI.	441	1323
Eveing	BDP & COM. SCI.	723	2369
Total		1164	3692

Over-enrollment from the 1st census of Fall 81			Total Classes
Day	BDP & COM. SCI.	5	9
Evening	BDP & COM. SCI.	12	14
Total		17 Classes	23

Introductory courses are over-enrolled as are the advanced ones given at night. There are class limits, but at present, West does not generally turn away students. The department prefers to over-enroll since experience shows that a considerable number of students drop out early in each semester.

5. Students

Some of the day students are working, while most of the evening students work. The retention rate is approximately 50 percent to 60 percent per semester. Many of the evening students have degrees and want to change careers or get some knowledge of computing.

The ethnic breakdown in day classes is the same as the rest of the college, but quite different at night, probably as high as 60 percent to 70 percent Caucasian.

6. Equipment

At the present time, equipment at West is not adequate; but in a year and half the Department would have enough, if it is allowed to spend the money currently budgeted. The department has acquired everything it presently has from VEA funds except its Xerox 530. Most recently, they have received 18 terminals from VEA, and are now receiving some other equipment. Nothing has been purchased from the campus budget or received from industry.

West has decided not to buy the Prime Minicomputer, but to return the Xerox 530 and use its budget to buy the latest microcomputers as they appear on the market throughout the next five years.

The following is the equipment presently in the lab:

1. Xerox 530, plus 4 key punch stations
2. Altos microprocessor with 4 terminals
3. Cromemco microprocessor
4. 2 Apple microcomputers with 4 more on order
5. Discovery microprocessor with 3 terminals
   This unit can handle as many as 16 terminals.

Next year the budget is $60,000 ($25,000 college and $35,000 from VEA), with which Fagen plans to buy more Altos microprocessors and other current equipment.

VEA Allocations for Equipment

1979/80 Business Data Processing	$ 7,538
1980/81 Business Data Processing	12,444
1981/82 Business Data Processing	25,135
	$ 45,117

7. Special Programs and Grants

Several years ago, R. Fagen received a District grant and used it to develop a Management Simulation Program for the Xerox 530. The simulator has been used several times in Management 11. Fagen also held two seminars for the LACCD Administrators Association last summer, which illustrated microprocessor applications to business and administration.

8. Remedial Programs

According to the department, some students have problems in English and math. No entry testing is done at present. There are remedial programs, but they are part of the Learning Resources Center. The tutors specializing in CS/BDP work in the Data Center and help the students there.

9. Relations with Industry

Many of the part-time instructors work in industry. R. Fagen is a Consultant at JPL, Cal Tech and other places. There is no on-site training or contract education but there are some outreach classes held at companies. Fagen has used his contacts to help place students into professional jobs directly.

10. Employment

The better students are extremely easy to place and, in fact, are placing themselves. A lot of graduates are placed at JPL and Hughes through Fagen's contacts and at the 20 to 30 smaller companies that call him for employees.

11. Coordination with Other Colleges

There is coordination through the BDP and Computer Science Committee which Feingold serves on. As a result of last summer's seminars, Fagen gets many calls from other campuses for help in planning computer acquistion.

12. Expansion and Improvements

There is a need for more equipment; there is a need for facilities - the lab is extremely small; and there is need for more faculty. Fagen would like to add at least five new courses. Examples are the following:

1. Realtime Computer Programming
2. Data Communications
3. Unix and C-Compilers (operating systems on DEC)
4. PASCAL
5. Microprocessor machine and assembly language

The equipment needed is more microprocessors, terminals, and associated micro-peripherals. The process for acquisition of equipment or obtaining of facility changes or electrical work is slow.

13. Needs and Problems

At present people are waiting to use the equipment in the lab. Also, there is a need for more tutors, because a lot of students need help. Facilities (rooms and data center) are really the limitation. They could hire more part-timers, if necessary, and could add full-time faculty if the budget allowed.

14. Future Plans

The department would like to go in two directions: expand microcomputers and expand the use of the larger system by the use of terminals. The department would like to build on what they already have, and add one or two advanced courses that would integrate courses now taught. Mainly they want to keep current with what's happening in the field, especially micro-processors and computer network applications. They would like to improve the quality of students and focus the course presentation to enhance job placement and/or transfer to four-year computer science programs.

15.. Miscellaneous

C. OUTLINE FOR SURVEYING EXISTING PROGRAMS

Campus_____

Department_____Chairman_____

PROGRAM

Briefly describe your program.

FACULTY

Describe your faculty briefly?

Do you have sufficient faculty?

Do you feel your faculty has kept current? How?

ENROLLMENT

What is the enrollment situation in your department?

Are your classes overenrolled? How many? Which ones?

Do you turn away students or have a waiting list?

Are you able to have enough sections? Why not?

STUDENTS

What is the profile of your day and evening students? Ethnic? Work? Workouts? Retention rate?

TEACHING METHODS AND SPECIAL PROGRAMS

What is the primary teaching mode in your department?

Do you have any non-traditional delivery systems, modular or short-term intensive courses?

Remedial Programs

Do your students need more preparation in English and Math?

Do you do any testing of entering students?

Do you have any remedial programs or facilities?

EQUIPMENT AND GRANTS

What is the equipment situation in your department? Industry? VEA?

What are your needs in equipment?

RELATIONS WITH INDUSTRY

Describe your department's relationship with industry? Consultation? On-site classes? Contract education?

Describe the members and activities of your Advisory Committee?

EMPLOYMENT

What success do your students have in obtaining employment? How?

COORDINATION WITH OTHER COLLEGES

What efforts are made at coordination between colleges? Programs? Equipment? Is it needed? Helpful?

EXPANSION AND IMPROVEMENTS

What do you see as ways to improve your program? Facilities? Faculty? Equipment?

What areas need expansion?

NEEDS AND PROBLEMS

Are there any special needs or problems in your department?

FUTURE PLANS

What do you see as the direction your department should take in the next five years under ideal financial conditions?

MISCELLANEOUS

Is there anything you would like to add?

SUGGESTIONS

Do you have any suggestions?

D. SPECIFIC RESPONSES TO SURVEY QUESTIONS EIGHT THROUGH TWELVE.

The following lists, by college, specific faculty responses to questions eight through twelve on the survey:

Question 8: What courses or programs not currently offered in your department should be added to the curriculum? (Please list)

City

Just more facilities for the present courses to accommodate more students.

Line Tech., bench tech., const.

Job control language courses, systems Analysis/Design - Additional Computer Science courses.

A special modular program for certificate or diploma in CS or BDP.

East

Field service, expanded Digital, technician, expanded communication.

Job control & query language & utilities.

Assembler Language (IBM) Data basic-admin.

Harbor

Offer BDP22, survey of DP; offer documentation; offer operating systems; offer systems analysis.

Systems analysis, Systems Software, Data Entry Devices.

Pierce

Add data structures - CS.

File management course needed.

Third semester assembler language course needed.

software-micro-computing, tele processing (courses set up but equipment not yet available)
CO SCI 29 Microcomputer I
CO SCI 5 Graphics
CO SCI 51 Teleprocessing Systems
CO SCI 2 Principles of CAD/CAM

Microwave needs.

Short courses providing training in specific areas.

More RPG II Programming-Beginning and Advanced.

Southwest

J.C.L. & A.P.L. systems classes & system problem classes.

Trade-Technical

CICS, IMS & advanced fortran.

Pascal, Fortran, Computer Mathematics Advanced Assembler, etc.

TSO, job control language.

Computer graphics, both business & scientific.

Opto-electronics, MC interfacing.

More program languages.

Industrial electronics, motion picture & TV production electronics.

Computer peripherals-terminals disc systems, interfacing, tape systems, optical systems.

Flight program.

Valley

Radio frequency courses.

Consumer & industrial electronics,

Large scale integration techniques.

IBM oriented courses.

CICS, IMS & advanced fortran.

Complier Design, Micro Assembly Lang, Micro Programming.

More language such as Pascal & Algol #0539.

Electronic trouble shoots - TV.

Certificate in Micro Computers.
Certificate in Computer Operator Training.
Computer courses in Networking.
Computer Graphics program.

Industrial Electronics and more consumer technologies.

Transaction processing on line environment. Systems analysis of complex project. Project management.

Increase the number and length of microprocessor program.

West

Pascal, Frtran, Computer Mathematics Advanced Assembler, etc.

More language such as Pascal & Algol #0539

Real-time programming.

Data Base Management, Management Info. systems, more sections of present courses, have 7 or 8 BDP I = 200 students per semester, have one class of BDP 77 = next course = 30 students.

Advanced electronics math.

Revise basics (drop batch) add personal computer consumer oriented purchasing - System design course w/out coding Program.

West

Database management systems, ADA, PASCAL math 63 & BDP-55.

Electronics drafting, day fender classes, T.V. servicing & video recorder servicing.

Electronics 22, 6, 68, 44 & 28, along w/physics 29.

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Question 9: What equipment is needed to improve your programs? (Please list).

City

Student materials and experimental equipment.

No additional equipment, just better reliability of mainframe and TSS equipment.

More hard copy units.

IBM mainframe, character terminals plotter, graphic terminals.

Laser equipment, digital test equipment.

Telecommunication transceivers and test equipment.

Summation sweep/cable T.V. testing equipment.

East

Main frame (IBM 4331) and Peripherals - (CRT, reader, tape Disk).

Digital volt meters.

DEC-VAX-11/50.

More basic equipment.

New printers, computers & terminals.

Harbor

Punched cards not used in industry.

RJE devise, interactive terminals.

Add on line interacting cobal w/terminals.

RJE to Honeywell.

Southwest

Cap bridges, universal bridges, call 12.

RCL-bridges and test and measurement equipment.

Trade-Technical

Updated computer-data entry machines.

New computer and data entry equipment.

More video tape disc and disc machines, cameras, projection TV receivers, cable TV equipment, new color TV receivers, wide band oscilloscopes, NTSC generators, etc.

Oscilloscopes, isolation transformers, variable transformers.

Meters, power supplies

New generation personal and small business computers. Modern software.

More terminals - more powerful minisystem pop up: Eclips 600; etc.

20 Microcomputers (IBM).

Pierce

State-of-the-art needed to experiment on A/C test equipment

Microwave needs

Current models of logic analyzers, scopes, generators, spectrum analyzers etc.

Microcomputer system, teleprocessing equipment, graphics terminals software.

In-house computers; preferably IBM - All texts for computer science are geared towards IBM. New films (16 mm).

Valley

Antenna distribution systems and monitors for LCR's.

ECL Logic families and associated; Logic boards capable of high speed logic implementation and tools for proper wire wrap for logic implementation.

More on-line terminals.

Faster printing capabilities, on campus student-instructor control of mini computers.

More CAI equipment and programs; more video assisted equipment.

Better terminals.

ZY Bridge-Capacitance checker.

More of what we have already.

West

A.V. Training aids.

Computer interface equipment, drafting tables.

Microprocessors.

Terminals & concentrator to administrative computer.

Computers and terminals, minicomputers, more compilers for languages.

Hydraulic powerplant and electrical equipment.

Question 10: What equipment is superfluous or needs to be updated? (Please list).

City

Microwave & test equipment.

Most of our test equipment.

Resistor boxes & devry boards.

Card equipment.

East

RF Generators-Microwave Equipment.

The proposed Prime 550-II approved by the District over the DEC-VAX 11/50 50 (see #9) will require a major renovation of our existing site - no such funds are available.

Keypunching.

Harbor

Keypunches are always broken.

029 Keypunch & unit records equipment.

Pierce

Xerox 530 computer.

Qmeters, Capacitor test equipment & bridges.

Southwest

Scopes.

Trade-Technical

All existing lab/test equipment,scopes, probes, meters.

More powerful machinery; better curriculum & teachers.

Trade-Technical

EAM Equipment; Key punch; computer.

Color TV receivers.

Building too small.

Shop furniture.

Triggerei-Oscillosicopes.

Probes, power supplies & pulse generators.

50% of equipment.

Data Entry equipment machine Computer.

Punched card equipment, except Keypunch.

Delete EAM.

Valley

Keypunches need replacing with new CRT devices.

Terminals.

Function Generators.

Replace logic conceptors with new high speed breadboarding & associated equipment.

West

Drop IBM 360 Bal Programming

IBM 2741S

Jet Engines, Basic Electricity Training Aids, Fire detection training aids, electrical Systems Aids.

Card sorter.

Question 11: What additional facilities are needed?

City

Lab tables for terminals, raised floor, patch panels and study space.

Debugging room.

Allow more classes of existing course.

East

Building conditions are very poor environments for teaching.

Remote terminals located away from computer room.

Pierce

A lab for T.V., aviation electronics and micro.

More "partitions" - modern machine.

A large room for additional terminals.

Large lecture halls with black boards.

Harbor

Modern temperature controlled, properly wired computer center.

Terminals tied to minicomputer that stand separate from system.

Class in use of Apple's and TRS 80.

Trade-Technical

Tape and disc units.

More room; additional lab.

Signature analysers, comparator and current tracers.

Trade-Technical

New electronics bldg.

More storage.

A larger mini-computer system with at least 16 terminals.

Modernized labs and lab stations. Modernized delivery system. (CAI, video etc.)

Expanded to PM sessions.

Valley

Modern teaching lab w/key boards; large screen monitor and space.

Additional classrooms and increased lab space. More work stations.

Better classrooms and more board space.

Committed labs would eliminate 1 hour set-up.

Office space for part-time employees, more labs.

Centralize classrooms with easy access to lab.

West

An area to taxi planes and hangers to store them.

Lab prep. room and regularly assigned classrooms equipped for electronics teching.

2 dedicated labs and stockroom, 1 lecture room.

More space for Data Center; more hands on facilities.

Network facilities for Distributed Data Processing (DDP).

Phone jack in classroom for "on-time demos"

A larger mini-computer system with at least 16 terminals.

Question 12: What additional personnel or teaching positions are needed to improve your program?

City

Instructors who teach more than 4 computer languages.

Additional EDP lab assistants (classified).

One instructor to teach Installer Tech. course.

East

There is little intra-campus interfacing. Business Data Processing varies from instructor to instructor. A standard curriculum should be used.

More qualified instructors.

One more full time instructor.

Harbor

Return more hours to evening instruction.

Be sure instructors are up-to-date in DP;if you are away from it for a year, you are 10 yrs. behind the times.

At least 3-4 times as many classes and integrated courses with 3-4 times as many instructors

Experienced industry person with design business systems experience.

Pierce

Permanent aides in Programming Classes.

At least one more person to absorb hourly instruction in day and to offer additional classes for the many students unable to get into our classes.

Knowledgable meter room attendants.

Trade-Technical

One FTE instructor, one FTE toolkeeper, change ICT from C6 to B6

Modernized labs and lab stations. Modernized delivery system,

Lab assistants and enrollment of 50 spending much time with instructor.

Depends upon new curriculum added.

Need people working in field more responsive to central processing education. Some work study programs,

Valley

EDP inst. assist.: part-time evening inst.; 5,000 student workers hours, 4 full-time instructors.

Four industry and consumer electronics people.

Student internship.

West

More evening instruction and part-time instructors

Data base management.

More personnel for additional courses/sections.

One Saturday instructor.

Need people working in field more responsive to central processing education. Some work study programs.

E. REPORT ON OTHER INSTITUTIONS

Los Angeles Unified School District

The original report on the LAUSD described the Regional Occupational Centers, and the Skills Centers; the following describes programs at the Regional Occupational Program (ROP), the Adult Community Centers and the Adult Basic Education Program (ABE).

1. Regional Occupational Program

This program is designed to train high school students (11th and 12th grade) for employment. Programs are offered at either the high schools or at worksite locations in local companies or industries. The instructors are mobile and the courses are taught in the off-hours-afternoons, evenings and Saturdays. The object is short-term training for immediate employment.

2. Community Adult Schools

Scattered through the community, these schools generally conduct classes between 5:00 p.m. and 10:00 p.m. They prepare the adult student (18 and older) for a high school diploma, admission to trade and technical schools, or entrance to colleges and universities. Courses required for high school diplomas are geared to adult interests, life skills needed for job success, and individual goals and educational needs. Course content covers fundamental skills (reading, math); life skills (health, consumer awareness); and academic and/or vocational specializations. In addition to courses, these schools provide testing, guidance and counseling to the adult learner.

3. Adult Basic Education Programs

This program provides day classes to the adult (he/she must be 18 or older) in ESL, reading improvement, language, and mathematics. This program is on a more basic level than the community adult schools. Courses are taught at six adult learning centers and other locations throughout the city. Students can receive their high school diploma if they wish.

CAL STATE UNIVERSITY, LOS ANGELES
Math & Computer Science
Donald Kiel, Chairperson

The primary objective of the program is scientific applications of programming to prepare students for working at companies such as Hughes and Lockheed.

1. Program Description

CSULA offers a four-year program leading to a Bachelor of Science Degree with an option in computer science and numerical methods that provides students with a basic knowledge of the digital computer and its application in using numerical methods to solve certain types of mathematical problems, and an option in Computer Science and Software Systems that provides students with a basic knowledge of both the hardware and the software of the digital computer.

2. Academic Level

The level in these programs is much higher than those found in the community colleges. The prerequisite is two years of Algebra, and one year of Geometry and Trigonometry in high school.

3. Teaching Methods

The traditional approach is used with the exception of some credit by examination, and cooperative education.

4. Students

a. Profile

The average student is age about 27-28, and many of them work. Many of these students are changing careers. About 33 percent of the students are women, and 20 percent are Hispanic.

b. Prerequisites For Entering The Program

Entry requirements are the same as those for the university. The California State University and Colleges use the following criteria: High school students whose G.P.A. is above 3.2 are eligible for admission; those whose G.P.A. is below 2.0 are not eligible; those whose G.P.A. is between 2.0 and 3.2 must add either their ACT or SAT test scores to determine if they are eligible.

c. Cost and Length of The Program

The B. S. at CSULA requires four-years to complete if the student has the required math courses from high school.

d. Accessibility

The school is accessible to students from the San Gabriel Valley,

Los Angeles and Pasadena and close to industrial centers such as JPL, and C. F. Braun in Alhambra. It is also close to areas of high unemployment in East Los Angeles. Many East Los Angeles College students go to CSULA.

e. Enrollment-Retention-Placement

The present enrollment is about 200 for the past five years, the trend has been up. The department doesn't turn away students at present. According to Kiel, enrollment will increase in the future but the university has limited funds and it is doubtful that they will be able to handle the extra students.

f. Articulation

CSULA and the LACCD have articulation agreements.

5. Successes and Problems

The main problems in starting a program are a shortage of teachers (most take jobs in industry for higher pay), and costly computer equipment.

6. Similarities to and Differences From LACCD Offerings

The level of programs at CSULA are much higher, more theoretical, and more oriented toward producing high level scientifically inclined programmers and analysts.

SANTA MONICA CITY COLLEGE
Business Data Processing
Frank Little, Dept. Chairperson

Santa Monica City College trains students for employment in the field or transfer to a four-year school.

1. Program Description

The college offers a A. A. Degree which takes two-years and an Occupational Certificate upon completion of 24 units with a grade of "C" or better in each course. The Certificate takes one year.

2. Academic Level

The program level is very close to that found at the Los Angeles Community Colleges.

3. Teaching Methods

The methods are traditional, consisting of the lecture-lab combination with only a little computer-assisted instruction.

4. Students

(a) Profile

The student's average age is going up and presently is about 27 years. A few of these students have another degree. Most of them take the introductory course simply because they want some exposure to the field, although some are interested in going into programming.

(b) Prerequisites For Entering The Program

There are no prerequisites for this program because of the fact that this is a community college.

(c) Cost & Length of The Program

There is no cost to the students. Certificates take one year and an A. A. takes two-years, although working students will usually take longer.

(d) Accessibility

The college is accessible to students and industry.

(e) Enrollment-Retention-Placement

The present enrollment is about 1,000 and has been going up gradually for the past five years. At present, the department is forced to turn away students. Little believes that enrollment will increase to the point where the

equipment for the number of students served will not be enough. In the long run, Little sees the demands to be cyclical.

5. Successes and Problems

The main problems in starting a program in Data Processing is getting adequate equipment and finding personnel. The problems in running such a program are that the students are not prepared for training in a profession that is very demanding.

6. Similarities To and Differences From LACCD Offerings

The programs and students are very similar in both the Santa Monica and the Los Angeles Districts.

7. Additional Pertinent Information

According to Little, SDC has done a good job in training the handicapped for careers in high technology. In Data Processing, employers prefer a four-year degree.

SANTA MONICA COLLEGE
Electronics
Herbert L. Schlackman, Dean, Occupational Education

Santa Monica College Electronics Department trains students for employment in the field (primarily in the day program)of electronics. They provide upgrade training for those already employed in the field, and for some students interested in transfering to a four-year institution.

1. Program Description

The department offers an A. A. Degree (60 units) and an Occupation Certificate that requires completion of 36 units with a "C" grade or better.

2. Academic Level

Schlackman said he could not compare the level of our respective programs.

3. Teaching Methods

The methods are the traditional ones of lecture and lab. The department is beginning to use the computer in some classes to solve electronics problems. The department uses VEA tutors to help students that have problems with electronics or math.

4. Students

a. Profile

The average age for day students is about 27. These students go to school full-time taking a program of 15 hours of Electronics and three hours of Electronics Math and work toward obtaining an entry-level position.
Some are already working; some even work in the Electronics industry. About 25 percent of them already have degrees. If these students want to go on, then they shift over to the evening division where the advanced courses are taught.
The evening student is older and is working toward a degree or a certificate. They have a mix of people in various stages of their career such as pre-employment, upgrade and retraining.

b. Prerequisites for Entering The Program

There are no prerequisites.

c. Cost and Length of The Program

Santa Monica College has instituted a fee of $15.00 per semester for the full-time student and less for the half-time and part-time students.
One year for the Occupation Certificate and two years for the A. A. Degree are needed.

d. Accessibility

There are a number of research and development companies in Santa Monica and small companies in computer electronics and service mechanisms that are mostly subcontractors.

e. Enrollment-Retention-Placement

The electronics program served 277 students as of the first census period of Fall, 1981.
Weekly student contact hours amounted to 1874.

5. Successes and Problems

In the past they had a problem recruiting students. In the last year most classes have been overflowing. They have difficulty in finding enough qualified people due to the salary demands in this field.

6. Additional Pertinent Information

Contacts with Electronics industry and EDD indicate a need to expand programs which they plan to do as soon as space and budget limitations can be overcome.
The Electronics Department is beginning to get equipment donations from industry, such as Xerox.
Schlackman recommended two topics to be studied: the cost of an education in Electronics and the income produced for the community by the people that are trained by the occupation programs.
Some Santa Monica students are beginning to work in the industrial park of Japanese companies on the Artesia Freeway.

EL CAMINO COLLEGE
Business Data Processing
Dr. Henry Mansfield

The program is designed primarily as a vocational one that leads to employment although some students take it in order to transfer.

1. Program Description

   The college offers an A. A. Degree and a Certificate of Competence, given to students that complete a specified number of courses with a minimum grade of "B".

2. Academic Level

   Very similar to programs in the Los Angeles Community Colleges.

3. Teaching Methods

   The teaching methods are the classic ones of lecture and lab. The only exception is credit by examination.

4. Students

   a. Profile

      Most of the students are already working in industry and are over 25, some of the students have some college and a few even have B. A.'s. Two-thirds of the present program is taught at night.

   b. Prerequisites For Entering The Program

      No entry requirements

   c. Cost and Length of The Program

      There is no cost to the students. The A. A. Degree takes 2 years.

   d. Accessibility

      El Camino is accessible to students in its district which is composed mostly of the beach towns. It is also close to an industrial concentration near the airport and pockets of unemployment. The unemployed population, however, is in the Los Angeles Community College District and doesn't fall in the El Camino District.

   e. Enrollment-Retention-Placement

      The present enrollment which has increased 25 percent over the past five years is about 1500. At present, the department is forced to turn away students. Mansfield believes the demand will continue to grow but that it is stabilizing.

5. Successes and Problems

The problems in starting and funding such a program are getting equipment and the difficulty in getting full-time people.

6. Similarities to and Differences from LACCD Offerings

We serve the same clientele and draw from the same population. We also have very similar programs, problems and needs.

7. Additional Pertinent Information

Mansfield believes that if the chronically unemployed have ability, then Business Data Processing is a field that will appeal to them because they will be able to advance rapidly and get high salaries.

This college is not involved in contract education because it takes too much time.

The primary equipment in the computer lab is an IBM 4331.

EL CAMINO COMMUNITY COLLEGE
Electronics
Harold Grantham, Dean

The objectives are to help employees to advance in their present job in the aerospace, missile and electronic industry or help people secure employment in various electronics and electronics related fields.

1. Program Description

Students at El Camino can receive an A. S. Degree with a major in Electronics. A Certificate of Competence is granted upon the completion of the general requirements and one specialty requirement that requires a grade average of "B" in major courses and "C" in related courses. The student can receive a Certificate of Completion that requires a grade average of "C". The following specialty areas are offered:

a. Electronic Computer Technician

b. Electronic Technician, Research and Development

c. Electronic Technician, Trade Preparatory

d. Communications

e. Radio-Television Service Technician

2. Academic Level

The academic level according to Grantham is very similar to that found in the Los Angeles Community College District,

3. Teaching Methods

The methods used in teaching are the traditional ones for electronics of lecture and lab. The only variants to this are independent study and a large program in cooperative education.

4. Students

a. Profile

The average student is 27 years or older. The day student is a high school graduate while the evening student has often finished college. Dean Grantham thinks that the students served by El Camino are very similar to the students of Harbor College. The career goal of most of the students is to become an Electronics Technician and get a job.

b. Prerequisites For Entering The Program

Like other California community colleges there are no prerequisites, besides having attained the age of eighteen or high school graduation.

c. Cost and Length of The Program

As a community college, there is no cost for students.

d. Accessibility

The school is very accessible to all parts of the District; there is no point in the District more than 25 minutes away. It also is in close proximity to high technology industry concentrations, especially in El Segundo, and pockets of unemployment east of Crenshaw.

e. Enrollment-Retention-Placement

The present enrollment in Electronics at El Camino is 800 and could be larger if the department did not have limited lab facilities. In some areas they are forced to turn away students. Grantham believes the enrollment will stay about the same or go up some but the mix will change, with Radio and Television dying and much of Electronics possibly doubling.

f. Articulation

Some El Camino students go on to Long Beach and Dominguez Hills. Many students from the Palos Verdes Peninsula attend El Camino instead of going to Harbor College which would be much closer and in their service area.

5. Successes and Problems

The biggest problem in starting a program in technical education is the huge initial capital outlay. One of the problems is that the new teachers usually come from jobs in industry and they do not understand the financial limitations that exist in the colleges.

6. Similarities To and Differences From LACCD Offerings

Grantham believes that the two districts are in competition and there will be some flow back and forth of students.

7. Additional Pertinent Information

The equipment at El Camino is "state-of-the art", the same as that used at TRW.

The job placement rate of the school is very high--they lose the students early.

The college doesn't have much contract education at the present time. They recently finished a CWETA program with TRW that was very successful. The CWETA program was an example of the possibility of training high school dropouts and the chronically unemployed for jobs in high technology, according to Grantham, although it involved high costs in counseling and remedial programs.

EDISON TECHNICAL INSTITUTE
George Alagna, President

Edison Tech is a nonprofit, independent, private school that is not tax exempt.
Edison Technical Institute trains students to work for such companies as IBM and Burroughs as Technicians.

1. Program Description

The program is a relatively short one of forty weeks that starts seven times a year. The total number of class hours is 1200, equally divided between lecture and lab. The emphasis is on digital and communication systems on the technician level. The program is divided into the following modules of 240 hours each: Basic Electronics, Semiconductors and Applications, Digital Circuits and Applications I, Digital Circuits and Applications II, and Electronic Communications.

2. Program Level

Level of the Edison Tech program, according to Alagna, is lower than that at the Los Angeles Community College District, because their program has very little math, is more practical oriented, and has no general education requirements.

3. Teaching Methods

Methods are the traditional ones of lecture and lab. There are seven starting dates during the year for the 40 week course.

4. Students

a. Profile

The average age of the student is 27. All have finished high school with just a few having some college work. Ninety-five percent of the students have a sufficient background in math and English. About fifteen percent are rehabilitation students from the State Rehabilitation Department.

b. Prerequisites for Entering The Program

There are no prerequisites although non-high school graduates are admitted on a probationary status.

c. Cost and Length of The Program

The cost of a 40 week course is $1,888.00. There is no cost to the public except for the rehabilitation students.

d. Accessibility

The school is fairly close to the concentration of electronics industries in the northwestern part of the San Fernando Valley.

e. Enrollment-Retention-Placement

The present enrollment is 70 students (it has been up to 700 in the past). Enrollment has been increasing the last five years and Alagna expects to go up to 100.
The retention rate is 30-35 percent.

f. Articulation

Some students at present continue at the local community colleges, where a few have gotten partial or full credit for their work at Edison Technical.

5. Successes and Problems

The graduates of Edison by and large have been able to satisfy the corporations that hire them.

The primary things to do, according to Alagna, in starting a successful program is to screen students carefully and then have a good program with reasonable equipment. The problem in running such a program is getting instructors.

Important for this private school is advertising for their programs. Alagna estimates that 80 percent of students hear about Edison from advertising in the "Yellow Pages" or in the Daily News.

6. Similarities to and Differences From LACCD Offerings

According to Alagna Edison Technical serves a different student clientele, one that is interested in short training.

7. Additional Pertinent Information

The corporations send representatives to the school during the last month of the 40 week training period.

At present, the school's Advisory Committee is inactive but some of the school trustees meet and advise the school.

NATIONAL TECHNICAL SCHOOLS
Albert Melconian, Assistant Director of Education

National Technical Schools train students for technical careers in business and industry by providing them with marketable skills for entry-level positions.

1. Program Description

National Technical offers an A. S. Degree in Computer and Electronics Technology (14 months, about 1500 hours) which prepares students to have entry-level skills related to Electronics and Computer Operations.
An A. S. Degree in Radio, Hi-Fi and Television Servicing (12 months, about 1300 hours); and a shorter course in Radio, Hi-Fi and Television Servicing (9 months, approximately 1,000 hours). The last two courses prepare the student for entry-level work on Radio, Hi-Fi and Television equipment.

2. Academic Level

The program level is probably somewhat below that of the community colleges which put more stress on theory and have a math requirement.

3. Teaching Methods

The delivery system used is the tradition one of lecture and lab.
Twenty-five percent of the students get credit for courses by examination and the drafting program starts every month.

4. Students

a. Profile

The age varies from 20 to 45. All but about 30 percent have finished high school. Students are weak in both math and English; the foreign students need ESL classes. The goals of these students are to go to work right away, although some transfer to other colleges and universities.
Melconian believes that we serve the same student clientele as they do.

b. Preprequisites For Entering The Program

The school prefers but does not require that a student be a high school graduate. The student must take an entrance examination and go through a personal interview to determine his/her "ability to meet the requirements of his chosen field."

c. Cost and Length of The Program

The length of the different programs varies from 9 months to 12 months. Computer and Electronics Technology (14 months), Radio, Hi-Fi and Television Servicing (9-12 months).
The cost of the above courses is unknown.

d. Accessibility

The school is located on Figueroa just south of downtown Los Angeles. It is not close to any concentration of the electronics industry but it is close to the banking and offices downtown that might hire computer maintenance personnel. It is accessible to a large number of minority students in central Los Angeles, Black, Hispanic and Asian.

e. Enrollment-Retention-Placement

Melconian did not know his present enrollment, although he did say that the enrollment has been going up and will continue to increase in the future.
The retention rate is about 50 percent.

5. Successes and Problems

The problems met by the institute are doing a market analysis to determine the need for the different occupations and getting adequate personnel to teach in their programs. The most successful thing National Technical Institute does is set up accelerated programs that condense 2 years of work into 12 month and 9 month periods.
The desire to start work as soon as possible is the primary reason that a student will go to a private school and pay thousands of dollars instead of going to a community college for no charge.

6. Similarities to and Differences From LACCD Offerings

According to Melconian, National Technical Schools serves the same students that we do. The community college programs seem to be of a higher theoretical and mathematical level and are much longer than National's intensive courses.

7. Additional Pertinent Information

National Technical School is involved in contract education with the State and City and also in training foreign students at the school. The school also has some remedial in-house programs.

COMPUTER TRAINING SCHOOL OF LOS ANGELES
Computer Science
Colin Thomas, Director

Computer Training School trains students for employment at the entry-level in programming or key punch.

1. Program Description

Programs consist of six month and fourteen month courses in programming and key punch operation.

2. Academic Level

Unknown

3. Teaching Methods

They use a traditional lecture/lab approach with plenty of hands-on experience.

4. Students

a. Profile

The student's average age is early 20's. Most of them are from Latin and/or South America and receive their training in Spanish. They return to their homes upon completion of their training. There are some local students that are studying programming in English. The foreign students are more successful than the locals in the courses.

b. Prerequisites For Entering The Program

Persons must be high school graduates to enter the school.

c. Cost and Length of The Program

Fourteen month course $1,800.00
Six month course 700.00

d. Accessibility

Not applicable.

e. Enrollment-Retention-Placement

Approximately 60 to 100 students. At present, the school must turn away students.

f. Articulation

Some students go on for further study.

5. Similarities To and Differences From LACCD Offerings

Unknown

NORTHROP UNIVERSITY
Engineering
Everett Welmers, Dean, College of Engineering

Students who study for the Certificates and the A. A. and the A. S. Degrees in the above programs either go on to careers as Technicians in their field or go on for a B. S. at Northrop University.

1. Program Description

The Institute of Technology is a part of Northrop University that trains Technicians in the areas of Aviation Electronics, Engineering Technology, Computer Technology and Computer Programming Technology.

2. Academic Level

The level of the vocational programs is roughly equivalent to that of the community colleges.

3. Teaching Methods

The primary teaching mode is the traditional one of lecture and lab.
The program runs year-round and new classes are started every four weeks.
The competency-based approach is used very heavily and those that do not meet the competency requirements must repeat the course.

4. Students

a. Profile

First, it should be noted that 75 percent of the students at Northrup are foreign students. They are usually in their early 20's and have finished high school; some have finished college. Their background in English and math is only mediocre.

b. Prerequisites for Entering The Program

The university requires that students in technology programs have a high school degree with a GPA of 2.0 or higher, complete the GED Test satisfactorily or other suitable criteria such as demonstrated work experience.
For the American students that do not meet these qualifications, there is a Preparatory Institute that offers a one quarter intensive (6 hours a day) block program that includes courses in English, mathematics, and the physical sciences. This is designed to help high school graduates who have not completed necessary secondary school courses or who need refresher courses.
These students must receive at least a "C" average prior to entrance into the regular program of study either for the Bachelor of Science or for the Associate and Certificate Degrees in Applied Science.

c. Cost and Length of The Program

The Avionics Technician Program that is 40 weeks long costs $3,438.00 and the 12 week Basic Avionics Program is $1,072.00

d. Accessibility

Northrop University has an ideal location for its specialty in Aviation Science. It is close to LAX and several aircraft manufacturing companies.

e. Enrollment-Retention-Placement

Northrop has about 800 in first-year vocational programs and 140 in Engineering Technology. There are also about 450 Engineering students. The increase in the last five years has been slight and the future increase is expected to be gradual.
At present, there are no students being turned away. Most of the students in the one-year intensive programs finish because they see a good job ahead.

5. Successes and Problems

The main problem in starting a new technical program is to get the right people, teachers, and administrators to do the job. Maintaining student interest over a long period of time is a major problem in running such a program.

6. Similarities To and Differences From LACCD Offerings

Dean Welmers believes that there is some duplication between Northrop's first two years and the community colleges. More specifically there is duplication between the courses of the Institute of Technology and the programs at the Los Angeles Community College District's Airport Center.

7. Additional Pertinent Information

Northrop University is slightly involved in contract education with business and industry and runs some off-campus programs in Engineering and Management.
Seventy-five percent of the student body is composed of foreign students, but Northrop is also involved in training foreign students abroad by contracting with foreign governments, such as Malaysia.

Northrop University Language Institute (NULI)

Northrop maintains an autonomous agency that helps the large foreign Student population with their studies. It provides training in English for students who want training only in English, for students that want to enter Northrop's academic programs, and for current students that need help with special terminology or special programs. It also tests entering students and places them at the appropriate level of ESL instruction.

URBAN LEAGUE TRAINING CENTER

The Urban League Data Processing Training Center has been in existence since 1968. It was organized jointly by the Bank of America Foundation, IBM Corporation and the Greater Los Angeles Urban League and is presently financed by the above groups plus the California Federal Savings and Loan and Atlantic Richfield Company.

1. Program Description

The center offers Computer Programming, Computer Operations, Word Processing and Secretarial Science. Interviewing techniques and employer expectations are also part of the training. Each student participates in several videotaped mock interviews while training. The center has a strict attendance and tardiness policy and failure to comply can lead to dismissal.

2. Academic Level

The program level is extremely high due to the small classes and the high standard of selecting only one in 12 applicants.

3. Teaching Methods

The methods are traditional but the classes are extremely small ones of five to six students.

4. Students

a. Profile

The average age is 25. Those studying Word Processing have high school diplomas while those studying programming usually have 2 years of college. The sex ratio is 40 percent men and 60 percent women in programming and 10 percent men with 90 percent women in Word Processing and Secretarial Science. Most of the students now in the program were unemployed. Means of livelihood while in the program are:

54% live with parents

37% live with friends

30% live on welfare

11% live on unemployment

b. Prerequisites For Entering The Program

The student must be a high school graduate or 18 and must qualify on the GED and not have been convicted of a felony. The standards are high: only 1 of 12 applicants is accepted. Each applicant is

given a test and an interview.
Training is limited to those who are unemployed or underemployed who could not normally afford the training.

c. Cost and Length of The Program

The program is free to the student. Six companies are now partners in the Urban League Training Center and they fund it. The present faculty are on loan from Pacific Telephone and in the past other companies have funded instructors.

d. Accessibility

The Center is in the heart of a high unemployment area, and fairly close to downtown where there is a high concentration of jobs in programming and Word Processing.

e. Enrollment-Retention-Placement

Present enrollment is thirty-three. They project 150 students for the near future.
The retention rate is very high. Of the students that get jobs after graduation, 80 percent are with the same company after a year and about 90 to 95 percent are still working.
Placement at present is not that good because of bad economic conditions. There is no new hiring, but normally 100 percent of the graduates get jobs.

5. Successes and Problems

Through the years the programs have been extremely successful in placing their graduates, many of whom are now middle or even top management people.

6. Similarities To and Differences From LACCD Offerings

This program is entirely subsidized by private corporations. The short, intensive nature of the program is extremely successful in retraining students for newer occupations.

7. Additional Pertinent Information

There is an Advisory Board composed of thirty business leaders that accept 50 percent of the schools graduates.

F. SURVEY QUESTIONNAIRES

LOS ANGELES COMMUNITY COLLEGE DISTRICT

N=1,450
(1-4)_____

Dear Student:

The Los Angeles Community College District is conducting a study of computer science, electronics, and related technical education programs. Because you are attending a Los Angeles Community College, your opinions are very important to this study. Please be assured that your identity will remain anonymous.

We appreciate your cooperation and assistance.

Linda Thor

Linda Thor, Director
Educational Services

Directions: Please read each question carefully and select one answer from among the alternatives. Place the number of your answer in the space to the right of each question. (Ignore the number in parentheses).

1. In which department is this course taught? (6-7)_____

13%	1.	Computer Science	0%	7. Accounting-Bookkeeping
30%	2.	Business Data Processing	0%	8. Banking and Finance
45%	3.	Electronics	4%	9. Computer Maintenance Technology
1%	4.	Aircraft Electronics	3%	10. Electronics Engineering
1%	5.	Electrical Engineering	2%	11. Consumer Electronics Technology
0%	6.	Business Management	1%	12. Aviation Maintenance Technology
			1%	13. Other_____ (Please specify)

2. Is your major field included in one of the above departments? (8-9)_____
If so, place that number in the space.

3. How many courses have you taken in this department? $\bar{X}$=5 Mdn=4 (10-11)_____
(Please write the number in the space at right).

4. Why are you taking this class? (12)_____
(Please write the number in the space at the right).

7%	1.	For general education
29%	2.	To transfer to a university
36%	3.	As part of a two-year vocational program
2%	4.	As part of a one-year vocational program
21%	5.	To improve my work skills
5%	6.	For another reason_____ (Please specify)

5. How would you rate the courses taken in this department? (13)_____

1. excellent (28%) 2. good (49%) 3. average (19%) 4. below average (3%) 5. poor (1%)

6. Why did you choose the program at this college rather than at another college? (Place a check in the space next to the reason or reasons).

36%	1.	The program has a good reputation	(14)_____
72%	2.	This college is close to my home or work	(15)_____
33%	3.	Classes are taught at convenient times	(16)_____
10%	4.	No other college in this area offers this program	(17)_____
30%	5.	Small cost	(18)_____
23%	6.	This college has a good reputation	(19)_____
24%	7.	The instructor has a good reputation	(20)_____
3%	8.	Other_____ (Please specify)	(21)_____

7. What additional courses would you take (which are not presently offered) if they were added to the program? (Please list below) (23)_____

8. Please indicate which of the following you would participate in if they were added to the program. (Place a check in one or more of the spaces.)

33% 1. Saturday or weekend classes ..... (24)___
46% 2. Classes at industry locations..... (25)___
47% 3. Short-term classes which can be completed in less than a semester.....(26)___
18% 4. Afternoon classes.....(27)___
35% 5. Individualized classes in which you could enroll at any time during the year.....(28)___
26% 6. Skill building courses (english, math) specifically.....(29)___
5% 7. Other _____.....(30)___
(Please specify)

9. Are you currently employed in an industry (such as computer or electronics) related to the field in which you are taking classes? (31)_____
1. yes (30%) 2. no (70%)

10. How many hours per week are you employed? $\bar{X}$=27 (32-33)_____
(Please write the answer in the space at right.)

11. How many miles do you travel (one way) to this college? $\bar{X}$=6.4 Mdn-4.7 (34-35)_____
(Please write the answer in the space at right.)

12. After completing your present program, would you attend a technical center for further specialization in such areas as Microwave, Lasers, Computers, or Electronics? (36)_____
1. yes(51%) 2. not sure at this time(39%) 3. no (11%)

13. If you indicated in the above question that you would attend a technical center, how many miles (one way) would you be willing to travel to attend classes? (Please write your answer in the space at right). $\bar{X}$=12 Mdn=10 (37-38)_____

14. Which college do you attend? (39)_____

21% 1. City
17% 2. East L.A.
16% 3. Harbor
4. Mission
5. Pierce
14% 6. Southwest
17% 7. Trade-Technical
8. Valley
15% 9. West L.A.

15. What is your age? (41)_____
(Please write your answer in the space at right.) Mdn=25 $\bar{X}$=27

16. Are you a: (42)_____
1. Female (30%) 2. Male (69%)

17. Place indicate to which one of the following ethnic groups you belong: (43)_____

20% 1. White
27% 2. Black
21% 3. Hispanic
22% 4. Asian
1% 5. American Indian or Alaskan Native
5% 6. Filipino
0% 7. Polynesian
4% 8. Other

18. Do you have a physical disability? 1. yes(6%) 2. no(94%) (44)_____

LOS ANGELES COMMUNITY COLLEGE DISTRICT N=140

(1-4)____

Dear Colleague:

The Los Angeles Community College District is conducting a study of computer science, electronics, and related technical education programs. We would like to have your opinion regarding these areas. Please be assured your identity will remain anonymous.

Please complete the following questionnaire and return it in the envelope via courier mail within 3 days. Your cooperation and assistance are greatly appreciated.

Linda Thor

Linda Thor, Director
Educational Services

Directions: Please read each question carefully and select one answer from the alternatives. Place the number of your answer in the space to the right of each question. Please ignore the number in parentheses.

1. In which prigram primarily do you teach: 1. Computer Science; (18%), 2. Electronics; (21%) 3. Business Data Processing; (32%) 4. Electronics Technology; (11%) 5. Computer Maintenance Technology; (5%) 6. Electronics Engineering; (0) 7. Consumer Electronics Technology; (1%) 8. Aircraft Electronics; (1%) 9. Aviation Maintenance Technology; (7%) 10. Other (4%) _____. (5-6)____
   Please specify

2. How many years have you taught this subject? (7-8) ____

3. Do you work or consult in the field in which you teach? (9)____
   1. yes (81%) 2. no (19%)

4. How would you rate the program as provided at this college? (10)____
   1. excellent (34%) 2. good (43%) 3. average (15%) 4. below average (6%) 5. poor (1%)

5. In your opinion is there a need to expand that program? Please explain either answer in the space below. (11)____
   1. yes (89%) 2. no (11%)

6. Assuming that new or additional programs are needed in such areas as Computers, Microwave, Lasers, and Electronics, which of the following options would be the best method of providing these programs. (12)____

   1. Add programs, equipment, and facilities to existing campuses. 81%
   2. Create programs with equipment and facilities at an off-campus location under the jurisdiction of one or more colleges. 8%
   3. Create programs with equipment and facilities at an autonomous technical institute. 11%

7. If an off-campus center specializing in new high technology programs were established under the administrative jurisdiction of one or more existing college, what effect do you think it would have on your current program? (13)____
   (24%) (22%) (54%)
   1. A beneficial effect; 2. No effect; 3. A harmful effect
   Please briefly explain your answer:

8. What courses or programs not currently offered in your department should be added to the curriculum? (Please list). (14)____

9. What equipment is needed to improve your programs? (Please list). (15)____

10. What equipment is superfluous or needs to be updated? (Please list). (16)____

11. What additional facilities are needed? (Please list). (17)____

12. What additional personnel or teaching positions are needed to improve your program? (Please list). (18)____

FOR EACH OF QUESTIONS 8 THROUGH 12, HOW MANY ITEMS DID YOU LIST?
WRITE THE TOTAL IN THE SPACE TO THE RIGHT OF EACH QUESTION.

13. Please rank six of the following options you would like to see added to your program in the order of preference: (Number one being the most preferable). Mean rank is listed

(20-21) 3.42 a. Add new courses.
(22-23) 2.15 b. Update or add new equipment.
(24-25) 2.74 c. Add instructors.
(26-27) 3.17 d. Update curriculum.
(28-29) 3.71 e. Allow for more flexibility in scheduling of courses.
(30-31) 3.59 f. Allow more flexibility in curriculum delivery.
(32-33) 3.92 g. Saturday classes.
(34-35) 4.04 h. Offering on-site industry training.
(36-37) 3.67 i. Change curriculum.
(38-39) 3.74 j. Diagnostic Testing of Students.
(40-41) 4.26 k. Increased counseling.
(42-43) 3.41 l. Development of remedial courses specifically to prepare technical students.
(44-45) 4.13 m. Close industry liaison.
(46-47) 5.00 n. Recruitment of minorities, women and other groups underrepresented in your program?
(48-49) 4.26 o. Opportunity for faculty professional development.
(50-51) 4.89 p. Better retention strategies.
(52-53) 2.56 q. Other (Most #1's are Harbor College-more space)

14. Please indicate by placing a check in the adjacent space which of the following professional activities would you like to participate in?

(55) 36% a. Release time (Faculty Extern) for updating expertise at Industry site.
(56) 9% b. Release time for recruitment of groups underrepresented in your discipline.
(57) 31% c. Opportunity to work to develop curriculum for new programs.
(58) 59% d. Opportunity to attend seminars on new developments in your field.
(59) 25% e. Opportunity to teach short intensive courses at industry sites.
(60) 32% f. Opportunity to be a consultant to business and industry in matters of in-house technical education.
(61) 10% g. Other _____ (Please specify)

15. At which college do you teach? (62)____

14% 1. City
9% 2. East L. A.
7% 3. Harbor
3% 4. Mission
16% 5. Pierce
5% 6. Southwest
19% 7. Trade-Technical
13% 8. Valley
15% 9. West L. A.

16. Are you full-time or part-time? (63)____

1. Full-time 47%
2. Part-time 53%

IF YOU HAVE ANY COMMENTS, PLEASE WRITE THEM BELOW.

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